Indian Museum Bull

Vol 17
1982

G. K. V.
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INDIAN MUSEUM
BULLETIN

28/9/85

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1982

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INDIAN MUSEUM BULLETIN

1982

CALCUTTA

Vol. XVII – 1982

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Annual Subscription

India, Rs. 30; Foreign, £ 5·00; U.S.A., $ 10·00

Edited and published by Dr. Sunil C. Roy, Director, Indian Museum, Calcutta-16 and printed by him from Sree Saraswaty Press Limited (Under West Bengal Government's Management), 32, Acharya Prafulla Chandra Road, Calcutta-9

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EDITORIAL NOTE

In summing up the achievements of the Indian Museum, after it had completed its one hundred years of existence in 1914, Asutosh Mookerjee, the then Chairman of the Board of Trustees observed that while in the fields of accumulation and preservation of objects, elucidation and investigation of specimens collected and diffusion of the knowledge acquired thereby, this institution showed notable activity, its efforts to transform it into a possible powerful instrument to arouse the interest of the public and to promote their instruction were not serious enough. He further remarked that this museum could be utilised as an adjunct to class room, as a bureau of information and as an institution for the culture of the people,[1] for which there was enough scope.

The Indian Museum has taken up several steps in recent years to project the displayed objects in a popular and attractive manner and provide allied informations in a way that could be enjoyable to the uninitiated. These include creation of the posts of Guide-lecturers, installation of a museo-bus, carrying models of objects exhibited in the galleries and equipped with audio-visual aids to deliver the message of the museum to distant places, publication of popular literature and picture post-cards on important collections and sale of replicas of select sculptures and minor art objects. The Calcutta University is holding its post-graduate classes for more than fifty years to illustrate lectures with actual specimens of objects housed in the galleries and reserve collections. In recent years, students of selected schools and colleges are invited to hold their classes in the very heart of the galleries, so that they can have close acquaintance with objects referred to in their text books. Educational films are shown in the auditorium for the benefit of children as well as adults.

Short courses of training in museum methods and administration are being held from time to time for advanced studies. This has been supplemented in the current year by a museum appreciation course meant entirely for lay persons. Those who attended and successfully completed this popular course were awarded certificates. It may therefore be modestly claimed that the reflections of Sir Asutosh did not fall upon deaf ears.

For an institution like the Indian Museum, dissemination of knowledge to the public in a popular and attractive manner can be only one of the facets of its many sided activities. Anybody will agree that critical analysis of the treasures that it possesses in its multidisciplinary repository and publication of such research should be its foremost activity. The product of such continuous intellectual speculations not only on its own specimens, but also on allied topics has resulted in papers presented in this volume.

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[1] The Indian Museum, 1814-1914, pp. 17, 18 (Calcutta, 1914).

In his paper on silver bent-bar or wheel-marked coins in the Indian Museum, A. N. Lahiri has described in detail some very early silver coins of the Indian subcontinent and has discussed their importance with special reference to the evidence of similar finds noted at other places. He has also critically analysed the divergent views held on the subject. Asok Kumar Das has made partinent observations about a portrait of Akbar worshipping the Sun, now in the Indian Museum. The remarks are likely to enrich the existing literature on Mughal paintings. Shyamal Kanti Chakravarty's suggestion of a figure as Vyāsa, now housed in the Okura Shukokan Museum, Japan and supported by an inscription deciphered by him deserves serious consideration. An image, possibly of Tārā, in a private collection of West Barlin is the subject matter of the paper of Gauriswar Bhattacharya and his decipherment of the accompanying inscription, leading the attribution of the piece to the reign of Devapāla, the Pāla ruler of Bengal, is no doubt, very interesting. Ajit Kumar Mukherjee has related in his paper how some of the mammals of north-east India are on the verge of being extinct. Apart from its value as a faithful record of prevailing conditions, the article attempts to place focus on the importance of preservation of animal life. H. K. Bhowmik and K. N. Rui, in their notes on grass hoppers from the Siwalik hills have made a field study of the existence of several new types of these pests, not known to have existed so far, in the Siwalik region. Pranab Ganguly has dealt in brief the nutritional affects on human life depending upon the nature and quantity of food, with special reference to Indian population. M. Ghosh has written about the ancestry of several species of animals from the remains found at well known historical sites. The fact that these came from proven ancient period, in some cases from well-defined archaeological strata, lends special importance to the paper. Atul Chandra Bhowmick has described two Viṣṇu sculptures from Purulia, which though assignable to the 9th-10th centuries A. D. evince, according to him, an art style distinct from that of the Pālas, but somewhat akin to the art forms that prevailed in the Mayurbhanj area in Orissa. B. N. Mukherjee in his article on commerce and money in the western and central sectors of eastern India, has described in detail the commercial activites during the Pāla-Sena period. His reflections about the use of certain types of coins in monetary transactions are likely to evoke interest of the scholars.

The variety of topics dealt at length in these papers is indicative of the multidisciplinary character of the Indian Museum. A discreet analysis, not only of the persent issue of the Bulletin but also of past ones, however, will show that greater emphasis is laid upon subjects like art-history, archaeology and anthropology than upon other allied topics of a purely scientific nature. This is perhaps inevitable as long as the Museum Directorete is bound to maintain a truncated existence with control over the sections on art, archaeololgy and anthropology only and the scientific sections continue to work independently under different organisations of the Government.

SILVER BENT-BAR OR WHEEL-MARKED COINS IN THE INDIAN MUSEUM

A. N. LAHIRI

IN his celebrated *Catalogue of Coins in the Indian Museum* (*IMC*), Calcutta, Vol. I (1906), p. 136, V. A. Smith recorded three somewhat *bent* bar-type archaic silver pieces bearing two broad identical symbols. He referred to them as 'bent bars', and duly recognised their numismatic entity. Since then such issues are generally known as 'Bent-bar coins'[1]. However, the three concerned pieces originally belonged to the Asiatic Society of Bengal, and were evidently acquired sometime in the last century.

Then, as noted by J. Allan in *A Catalogue of Ancient Indian Coins in the British Museum* [*BMC*(*AI*)], 1936, the British Museum acquired 'four' such coins from the Stubbs Collection as early as 1865[2], while another specimen belonging to the India Office came to that museum in 1882[3].

The Indian Museum, Calcutta, had again six specimens of this rare and rather obscure coinage from the Director General of Archaeology in India (DGA) in 1910. The *Annual Report* of the DGA for the financial year 1919-20 speaks of some coins of 'punch-marked variety, including bent bars' of billon and silver. The British Museum then acquired three such coins from the Whitehead Collection in 1922[4], while another coin came to its cabinet from an undisclosed source[5].

The famous 1924 Bhir Mound (Taxila) Hoard of silver punch-marked coins also included 33 bent-bar specimens and the *Annual Report of the Archaeological Survey of India*, 1924-25 speaks of them as: "Some are oblong bent bars, from 1¼″ to 2″ in length, punched with the usual 'cross and ball' symbols;......" And in this *Annual Report* we are possibly for the first time furnished with illustrations of 'nine' bent-bar coins in Plate IX. But these coins remained obscure and virtually unrecognised till J. Allan published the nine British Museum coins in 1936 in *BMC*(*AI*), pp. xv-xvii and 1-2, and illustrated three of them in Plate I. The next year Durga Prasad discussed and illustrated one Taxila Museum specimen in *Numismatic Supplements* to the *Journal of the Asiatic Society of Bengal*, No. XLVII, p. 78 N, Plate 11.1[6].

However, all the thirty-three bar-coins of the 1924 Bhir Mound Hoard were published and illustrated by E. H. C. Walsh in *Memoirs of the Archaeological Survey of India*, No. 59, entitled Punch-marked Coins from Taxila *(PMCT)*[7], 1939. But it was M. G. Young who, while publishing the eighteen bent-bar coins of the 1945 Taxila Hoard in *Ancient India* (*AI*), No. 1 (1946), pp. 27-32, Plate V, thoroughly discussed the technical aspects of these extraordinary coins. In the same paper Young illustrated besides the said eighteen specimens, five stray coins discovered at Taxila from time to time, and two pieces from the Cuthbert King Collection in Plate VI-A. Then, in 1955 R. Curiel and D. Schlumberger published with illustrations twelve such coins from the Chaman Huzuri (Kabul) Hoard in the French publication entitled *Tresors Monetaires d'Afghanistan* (*TMA*), p. 37, Nos. 1-12 Pl. III.1-12. The *TMA* at p. 73 also provides us with details of 50 full specimens of this coinage, as secured by the Kabul Museum from the Mir Zakah Treasure.

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[1] *Cf.* J. Allan, *BMC*(*AI*), p. xv.
[2] *BMC* (*AI*), pp. 1-2, Nos. 5-8.
[3] *Ibid.*, p. 1, No. 4.
[4] *Ibid.*, p. 1, Nos. 1-3.
[5] *Ibid.*, p. 2, No. 9.
[6] *Cf.* Note 1: "Not yet published".
[7] See *PMCT*, pp. 2-3 ('The Long-bar Coins') and p. 100, Nos. 1-33 Pl. IV. 1-33.

In 1958 the *Sale Catalogue* (*HSC*)[8] of the H. L. Haughton Collection of coins published by Sotheby & Co. listed and illustrated nine 1942 Bajaur Hoard coins as procured by that renowned collector[9]. These are virtually the more important publications where these so-called bent-bar coins have hitherto been primarily dealt with. Of course, various scholars have noticed and discussed them in a stray manner in different publications. Chief among them are the brief but valuable comments of J. Marshall, E. H. C. Walsh and J. Allan on the Bhir Mound (Taxila) Hoard specimens as made in Chapters 38, 40 and 41 of Marshall's *Taxila*, Vol. II (1951). C. Roy Choudhury published in 1962 two full coins of the bent-bar series in *A Catalogue of Early Indian Coins in the Asutosh Museum*, p. 1, Plate IV.

We, on our part, have given a brief but fair account of these coins in our comprehensive papers published in the *Journal of the Numismatic Society of India:* (1) "The Punch-marked Coins and the Question of their Prototypes"[10], Vol. XXX (1968), pp. 1-9; (2) "Archaic Coins of Northern India", Vol. XXXV (1973), pp. 5-10; and (3) "Complexities of Silver Punch-marked Coins", Vol. XXXVIII (1976), pp. 1-34[11]. P. L. Gupta has also given a brief account of these coins in his numismatic handbook entitled *COINS*, 1969, pp. 12-13. Michael Mitchiner dealt with these coins in his book, *The Origin of Indian Coinage* in Section IV ('Taxila-Gandhara'), pp. 54-59.

The most important feature of these bar-type coins relate to their curiously 'elongated' and 'bent' fabric, for which they have derived their name—Bent-bar coins.

As it appears, blanks for the coins of the three denominations (full, quarter and eighth) were first cut off in elongated and square bits from a sufficiently wide silver bar of some length. The corners of the elongated or square blank-bits were then cut or filed off probably to adjust their weight and give them a better look. The broad wheel-like symbol with diameter ranging between ·8 and·6 inch was finally stamped on the duly processed and highly heated blanks by what appears to be a slightly convex die-punch. The Symbol is a wheel-like design in relief and occurs in an incuse. It is composed of six circular tridents and sometimes also a straight line—all radiating from a central ring having a dot in the middle. The outer prongs of the radiating tridents curve inwards until they touch or nearly touch the straight middle prongs at or just before the point where they reach the rim of the incuse. [*Cf.* Young, *AI,* I, p. 29; Allan, *BMC (AI)*, p. xvi; and Walsh, *PMCT,* p. 2.]

The elongated blanks invariably had two impressions of the symbol probably to prevent shortening as surmised by Young[12], while the smaller squarish ones of quarter and eighth denominations received only one impression of it. The great force with which the elongated and heated blanks received two punch-

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[8] *Catalogue of a Valuable Collection of Coins formed by the Late Major-General H.L. Haughton*, London, 1958.

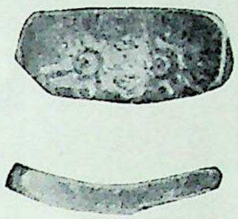
[9] *Ibid.*, p. 93, Nos. 587-595 Pl. XXVI. 587-595.

[10] This paper discusses various aspects of the so-called Bent-bar or Wheel-marked coinage, including the period of their currency and issuing authority, while commenting on A.D.H. Biver's paper. "The Chaman Huzuri Hoard: Countermarked Greek Flans as the Prototypes of the Indian Punch-marked Coinage", *Numismatic Chronicle*, 1954, pp. 163 ff. (Plate XIII).

[11] The paper deals with the silver coins of the complex punch-marked system as a whole, including the Bent-bar or wheel-marked issues. It shows how the 'full' wheel-marked coins representing *Śatarati Śatamānas* were the spiritual descendants of the 320-rati theoretical Vedic *Śatamānas*, *JNSI*, XXXVIII, pp. 9 ff.

[12] See *AI*, No. 1, p. 29

PLATE 1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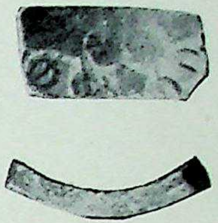
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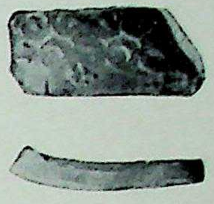
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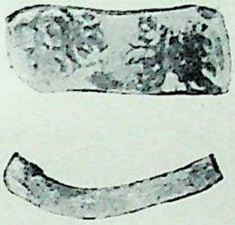
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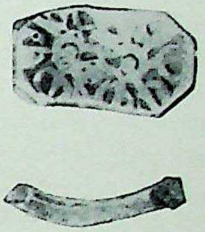
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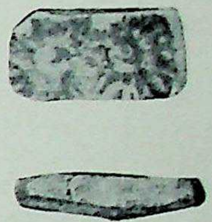
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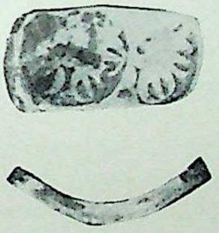
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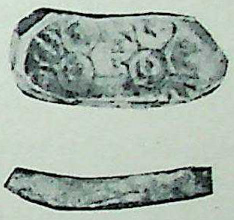
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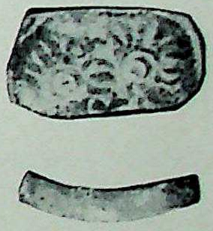
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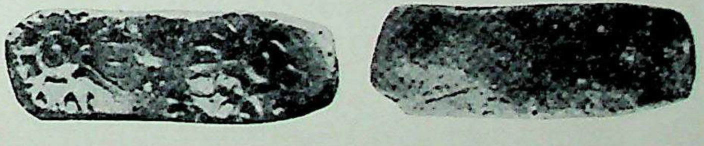
10

Silver-bent or wheel-marked coins in the Indian Museum

impressions in quick succession bent them to some extent. But the stamping of the symbol could not bend the smaller blanks of coins of lower denominations, since the broad punch with which they were stamped was too big to cover them up. Thus, while the big elongated coins are 'bent' and bar-like, the smaller pieces are 'unbent' and *not bar-like* in appearance. 'Bent-bar' cannot therefore be the designation for the specimens of all denominations of this unique currency. A. D. H. Bivar calls them 'wheel-marked coins', because of the characteristic wheel-like symbol they bear[13].

Wheel-marked coinage of the full two-symbol elongated denomination has two easily discernible varieties. The width of the coins of one variety is broad enough to bear the entire impression of the big wheel-like symbol, but because of the inadequate length of their blanks the two impressions of their symbol often interfere with each other, the first impression being partly overlapped by the second full impression. Coins of this variety may well be designated as 'short-bar issues'[14], as represented by the thirty specimens—of the Indian Museum, the British Museum and the Chaman Huzuri Hoard.

Wheel-marked coins of the other variety are longer and narrower in fabric, and they may naturally be called 'long-bar coins'[15], as against their just dicussed counterparts which look like short bars. As many as fifty-two specimens (out of a total of fifty-six) unearthed from the excavations at Bhir Mound (Taxila) represent this long-bar variety of wheel-marked coinage.

Any way, let us see how V. A. Smith studied the three wheel-marked coins of the Indian Museum. "The heavy bent bars of silver (Nos. 4-6)", said he, "marked with simple symbols on the concave side and blank on the convex side, have an extremely archaic appearance and may well go back to 500 or 600 B.C."[16] He then spoke of the standard weight to which they conformed. Weights of these three coins, *viz.* 169, 165·8 and 174·1 grains, led Smith to surmise that they were 100-rati pieces[17]. It is highly remarkable that handling only three then unheard of, and otherwise obscure, silver bars bearing peculiar symbols, Smith readily recognised their numismatic entity, judged their hoary antiquity and determined their precise metrology, which, as we shall see below, has been proved to be correct—on the basis of discovery and publication of many such coins.

Any way, we would now make a technical study of the Indian Museum specimens of the wheel-marked currency, which is the subject matter of this paper. The first three pieces, as recorded by Smith, came from the Asiatic Society, while the six others which B. B. Bidyabinod listed in the *Supplementary Catalogue of the Coins in the Indian Museum, Calcutta*, Vol. I, (1923), p. 8, bearing Registration No. 1471 of 8.8.1910. Notably enough, these latter six coins are strikingly similar to the former three Asiatic Society specimens. Unfortunately, neither Smith nor Bidyabinod illustrated the coins. They are possibly for the first time illustrated in this paper. The following are their descriptions:

A. The ASB Coins as listed by Smith: IMC, I, p. 136

1(4). Wt. 169 grains. Sz. 1·1 × ·55 inch.
Obv. (Concave side) Two broad wheel-like symbols, one partially overlapping on the other; a countermark on the right side.
Rev. (Convex side) Blank. [Pl. I. 1]

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[13] Bivar in his paper (see note 10 above) designates the coins under study by the term 'Wheel-marked', because of their wheel-like symbol, which Allan duly notes, *BMC(AI)*, p. xv.

[14] M. G. Young rightly calls them 'short bars': *AI*, No. 1, p. 30.

[15] E.H.C. Walsh first called them 'Long-bar Coins': *PMCT*, p. 2. Young also uses the term 'long bar' to denote them: *AI*, No. 1, p. 30.

[16] *IMC*, I, p. 133.

[17] *Ibid.*, p. 134.

2(5). Wt. 165·8 grains. Sz. 1·2×·55 inch.
Obv. (Concave side) The same two symbols partially impressed and similarly interfering with each other.
Rev. (Convex side) Blank. [Pl. I. 2]

3(6). Wt. 174·1 grains. Sz. 1·22×·55 inch.
Obv. (Concave side) As on No. 2.
Rev. (Convex side) Blank. [Pl. I. 3]

B. The DGA Pieces as listed by Bidyabinod: IMC(S), I. p. 8

4(127). Wt. 172·66 grains. Sz. 1·15×·5 inch
Obv. (Concave side) Two wheel-like symbols stamped separately. The impressions are slightly off the flan, which is comparatively narrow.
Rev. (Convex side) Blank. [Pl. I. 4]

5(128). Wt. 176·7 grains. Sz. 1·0×·55 inch.
Obv. (Concave side) Two wheel-like symbols, one being stamped slightly above the other, due to short length of the flan, which is wide enough to bear the full impressions of the symbols.
Rev. (Convex side) Blank. [Pl. I. 5]

6(129). Wt. 178·3 grains. Sz. 1·0×·5 inch.
Obv. (Concave side) As on No. 5.
Rev. (Convex side) Blank. [Pl. I. 6]

7(130). Wt. 174·2 grains. Sz. 1·1×·6 inch.
Obv. (Concave side) One broad wheel-like symbol in round incuse overlapping the initial stamped one due to shortage of required length of the flan, which is otherwise broad enough to bear the entire symbols.
Rev. (Convex side) Blank. [Pl. I. 7]

8(131). Wt. 169·1 grains. Sz. 1·0×·58 inch.
Obv. (Concave side) As on No. 6.
Rev. (Convex side) Blank. [Pl. I. 8]

9(132). Wt. 169·1 grains. Sz. 1·0×·58 inch.
Obv. (Concave side) As on No. 5.
Rev. (Convex side) Blank. [Pl. I. 9]

These nine coins have a conspicuously archaic appearance and betray the same general style. Their flans have more or less similar thinness as well as somewhat uniform length and breadth. The thinness vary between ·14 and ·2 inch, while the lengths are between 1·0 and 1·22 inch, and breadths between ·5 and ·6 inch. But the first three pieces, as listed by Smith, seems to represent a somewhat early mintage, when, due to lack of experience the moneyers did not subject the blanks to required heating to make them susceptible to bear uniform stamp impressions. Consequently, the first two coins show only partial impresses of the stamping. The second six coins as listed by Bidyabinod, got over this initial technical drawback, and, consequently, bear uniform and full impresses of the symbols stamped twice on each specimens. Coin No. 3 bears a countermark, which shows that it had more effective and active circulation; and in this respect it is possibly unique among the thirty prominent short-bar coins[18]. Incidentally, almost all known long-bar coins invariably bear one or more countermarks, indicating prolonged active circulation. And, significantly enough, each of the four apparent short-bar specimens included in the 1924 Bhir Mound Hoard (*PMCT*, p. 100, Nos. 1, 3, 20 and 23), which contained mainly long-bar pieces, also bear countermarks[19], since they evidently underwent much prolonged active circulation before being placed into the hoard.

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[18] As represented by 9 specimens of the Indian Museum, 9 pieces of the British Museum and 12 coins of the Chaman Huzuri Hoard.

The Indian Museum has since required another short-bar Coin: see Indian Museum's *Second Supplementary Catalogue of Coins* to Vol. I by S. P. Basu, 1977, p. 5 and Pl. I. 3 [*Pl. I. 10:* Enlarged].

M. Mitchiner believes that 'broad-bar' or short-bar coins were minted in the region to the *west* of the Indus, while the narrow-bar or long-bar pieces were struck in the region to the *east* of that river. "The broad bars predominate in the west", says he, "and comprise all the bars in the Chaman Hazouri hoard from Kabul, while the narrow bars predominate in the east and comprise all the bars from Bhir Mound Taxila hoard. In conformity with geographical boundaries and with the division of the Persian satrapies at the time of Darius I one can infer that the two regions were separated by the Indus so that the broad bars were essentially the coinage of Gandhara while the narrow bars were struck at Taxila"[20].

Mitchiner, apparently like W. W. Tarn[21], thinks that the terms 'Gandhāra' and Taxila' denote two mutually exclusive and separate geographical entities. But during the period of currency of the bent-bar or wheel-marked coins Gandhāra was an extensive Janapada situated on both sides of the Sindu or Indus, with Pushkalāvati (modern Charsadda in Peshawar District) as the capital of the western part and Takshaśilā—Taxila (in Rawalpindi District) as the capital of the eastern part[22]. It is not again easy to accept Mitchiner's sweeping generalisation that the broad-bars (i.e. short-bar coins) were essentially the coinage of the region he calls Gandhāra (i.e. western part of Gandhāra), while the narrow bent-bars or long-bar pieces were struck at Taxila (i.e. the eastern part of that Janapada). It is true that twelve better-known specimens of the short-bar variety came from the western region (at Chaman Huzuri) and some twenty-nine better-known pieces of the long-bar currency were excavated from the eastern region at Bhir Mound (Taxila). But when we make a close study of the respective find-sports of the known wheel-marked coins of the short-bar and long-bar varieties, we have a different picture.

The *TMA* records fifty 'full' wheel-marked coins coming from Mir Zakah ninety-five miles south of Kabul *in the west*[23]. Of these coins now lying in the Kabul Musuem, we have examined photographs of twenty-five specimens; and more than half of these pieces are of the long-bar variety[24]. At least nine of the wheel-marked coins procured by H. L. Haughton from the 1942 Bajaur Hoard are long-bar pieces[25]; and Bajaur is a well-known *western site*. So we may not be sure that long-bar or narrow-bar coins predominate in the eastern region around Taxila.

On the other hand, there is no clear evidence to show that the short-bar or broad-bar coins of the Indian and British museums came from the western region. Six of them were presented to the Indian Museum by the DGA, which fact indicates that they were procured in course of exploration or excavation from some important archaeological site like Taxila (in the east). Then, four of the British Museum coins came from Rawalpindi which also points to an eastern site for them. Again, the 1924 Bhir Mound (Taxila) Hoard which predominantly contained long-bar or narrow-bar issues, had at least four short-bar or broad-bar pieces[26]. All these go to show that Mitchiner's generalisation about the find-spots of the two distinct varieties of wheel-marked coinage is not tenable. Their mintage appears to have nothing to do with any geographical consideration.

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[19] See for 'countermarks' *PMCT*, p. 100, Nos. 1, 3, 20 and 23.

[20] *The Origins of Indian Coinage*, pp. 95-96.

[21] Cf. *The Greeks in Bactria and India*, 1951, p. 135.

[22] See H. C. Ray Chaudhuri, *PHAI*, 6th Edn., pp. 59-60. As Ray Chaudhuri says: "The Country of Gandhāra lay on both sides of the Indus, and contained two great cities, *viz.* Takshaśilā and Pushkarāvatī, alleged to have been founded by two heroes of the epic fame...", *viz.* Takshya and Pushkara (see the *Rāmāyaṇa*, VII, 113.11: 114.11; *sindhor-ubhayataḥ pārśve*). See also D. C. Sircar, *Geography of Ancient and Medieval India*, 1960, p. 24, note 2: "Gandhāra=Rawalpindi and Peshawar Districts. *Cf.* Raychaudhuri, *op. cit.* [*PHAI*, 1938], pp. 124 ff. The ancient capitals of the country were Takṣaśilā in Rawalpindi Dist. and Puṣkalāvatī (Charsadda near Peshawar),.....".

[23] *TMA*, p. 73.

[24] *Cf.* DGA's office Photo Neg. Nos. 721/56 (15 coins) and 722/56 (10 coins).

[25] Cf. *HSC*, p. 93, Pl. XXVI. 587-595.

A comprehensive, critical and comparative study reveals the sequence of the stages of evolution of the wheel-marked currency. It is now almost certain that short-bar coins were evolved in the initial stage and the long-bar pieces were minted *subsequently*.

The respective non-occurrence and occurrence of countermarks on them on the one hand and the distinct fabrics of the short-bar and long-bar coins on the other hand give us a clear picture of their respective use and circulation. The short-bar coins are conspicuous by their non-bearing of countermarks, which fact shows that they went through very little or no circulation worth the name. They were considered to be covetable items of wealth and were quietly hoarded as such. This explains their virtual non-circulation and non-bearing of countermarks. These short-bar coins of remarkably broad flan evidently represent the intitial issues of the curious wheel-marked currency[27]. They were sparingly minted in small numbers and were not easily available to the general public and the bulk-users like the shroffs, bankers and revenue officers. Hence they did not provide any scope to persons who handled good numbers of coins, to put on them their respective testing marks or countermarks, which invariably occur on coins which underwent prolonged active circulation. Naturally, short-bar coins which were sparingly minted allowed their manufacturers much time and due scope for being meticulous about processing of blanks of required width before stamping them with the characteristic broad wheel-like symbol.

Before long, however, the condition changed, and the wheel-marked currency gained immense popularity as a very convenient medium of exchange in the realm of trade and commerce, and, consequently among all sections of the affluent people. Increased demands naturally created brisk activities in minting units. The production machinery was geared up to cope with the situation, and a sort of mass production had to be resorted to. Large numbers of blanks had to be processed easily and quickly. Long-bars of much less width than was necessary were prepared in as short a time as possible, and bits of required weight were then cut off from them to provide coin-blanks. They were then impressed with *the same broad wheel-like symbol* which had duly become characteristic of the currency. Naturally enough, "all relation between the dimension of the coin and the die" disappeared[28]. Consequently, the narrow blanks could not bear the full and entire impresses of the big broad symbol. But nobody seems to have cared for this anomally, which was not considered to be of any consequence—so long the coin was of pure metal, its weight followed the specification and it bore the characteristic symbol (however imperfectly). Evidently, the later long-bar mass-produced coins gained great amount of popularity, and soon became well-established as a very useful medium of exchange. They enjoyed prolonged active circulation, in course of which almost each specimen passed through occasional testings by bulk users and received their respective 'testing marks' or countermarks[29]. So far as the currency of the wheel-marked coins is concerned, it appears that they ceased to have been manufactured by the middle of the fourth century B.C. For, as rightly observed by Young, "There is no hint of their existence in Mauryan Taxila, still less in the succeeding Indo-Greek period"[30]. The wheel-marked coins of the 1924 Bhir Mound Hoard consisting mainly of long-bar specimens were, like the Persian siglos that was included in the hoard, "in a worn condition compared with the rest of the find"[31], *i.e.* the very large number of silver *kārshāpaṇas* and the two Attic tetradrachms of Alexander the Great and Philip Ariadeus (323-317 B.C.). And this fact indicates the lower limit of the currency of the wheel-marked coinage and also means that by 317 B.C., when the hoard was buried, the bar coins had long been in *active* circulation. Under the circumstances, Allan naturally held that the coins under reference "belonged to the fourth, or even fifth, century B.C."[32] On the other hand, the inclusion in the 1933 Chaman Huzuri Hoard of the short-bar coins (which are themselves of an earlier mintage than their long-bar counterparts) appear to fix the upper limit of their currency to at least the fifth century B.C., if not earlier. For, as we see, the composition of the actual contents of the hoard points to such a conclusion, since the hoard included, *besides the twelve full short bent bars and eleven 'quarter' pieces of the wheel-marked category,* 20 miscellaneous Greek coins of the sixth century B.C., 38 Athenian drachms, 9 Persian sigloi and a group of 29 strange coins, which fall into six common Greek denominations but were *restruck* by broad motifs[33]. No doubt, the association of the wheel-marked coins with Greek and Persian coins of high antiquity is certainly significant and indicative of their very ancient date. Smith was, therefor, not far too wrong when he surmised that the three unheard of, and obscure, wheel-marked pieces of the Indian Museum might well go back to 500 or 600 B.C.

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[26] Cf. *PMCT*, p. 100, Pl. IV. 1-33.

[27] A Cunningham's observation that 'earliest specimens' of silver punch-marked coins are '*generally thin and broad*' holds good not only of the (1) 32-rati *Pūrṇa kārshāpaṇas* and (2) 24-rati *Tripāda kārshāpaṇas* but also of the (3) 100-rati *Śatamāṇas* of the present wheel-marked category: cf. *JBORS*, 1919, Pls. (1) I-III (earliest known very broad *kārshāpaṇas* of the Golakpur Hoard) and *BMC* (*AI*), Plates II-VI (later small-flan *kārshāpaṇas*); (2) *Num. Supplements*, XLVI, Plates I-III (earliest known board-flan *Tripāda kārshāpaṇas*) and *ibid.*, Pl. VI. 1-5 (small-flan *Tripāda kārshāpaṇas* of the Paila Hoard type); and (3) *BMC*(*AI*), Pl. I. 1-3 (early broad-bar full wheel-marked coins) and *HSC*, Pl. XXVI. 587-595 (later narrow-bar full wheel-marked coins).

[28] M.G. Young, *AI*, No. 1, p. 31. As he shows, broad-bar coins were evolved earlier than the long-bar ones. After making a critical and comparative study of various specimens of the wheel-marked coinage, Young says: "we may conjecture therefore that bar coins were originally intended to be of uniform width and to carry circular impresses of a like diameter. The Whitehead coins and coin No. 24 of the 1924 hoard are examples of this intention, which began, however, to be abandoned even in the older types, owing presumably to the difficulty of obtaining ingots of the right shape. In the later types, all relation between the dimensions of coin and die have disappeared."

Now, who were the issuers of the wheel-marked coinage? J. Allan, who first made a critical study of these coins, has not been specific on this point. He says that the "coins of which the provenance is definitely known all came from that part of India which lay within the bounds of Persian empire, from the end of the sixth to the middle of the fourth century B.C."[34]. Allan, therefore, concludes that "the date of their issue may very well fall within the period of Persian influence in India or Afghanistan"[35]. Consequently, Allan holds that the metrology of the wheel-marked coins should follow the metrology of the Persian silver currency. But who did actually issue them?

Allan concludes his discussion of the British Museum coins by saying that "it may have been pieces such as these rather than the usual punch-marked coins that Omphis presented to Alexander the Great"[36]. G. M. Young took up Allan's suggestion. "Allan suggests", says he, "that the present of 80 talents of stamped silver which, according to Curtius, was made by Omphis, King of Taxila, to Alexander in 326 B.C. may have consisted of bar coins. Assuming that Curtius's story is founded on fact, the evidence of the Bhir Mound coins supports this suggestion. The big proportion of relatively little-used pieces would be consistent with a period of exceptional activity in the Taxila mint a few years before"[37]. There is in Young's discussion a broad hint that the Taxilan kings, Omphis and/or his predecessors, might have issued wheel-marked coins of at least the long-bar variety. But wheel-marked coins which were in active circulation for over a century from the early part, or at least the middle, of the fifth century B.C. to the middle of the fourth century B.C., could not have been the royal issues of Taxila. For Taxilan princes had no control whatsoever over the Kabul-Mir Zakah region in Afghanistan, where they seem *also* to have been freely current. On the other hand, the Persian kings do not appear to have issued them even though they had 'some' political authority over the territories where they were in circulation. For, had the Persian monarchs issued them, they would naturally take the form of Persian silver coins, *viz.* the *siglos*[38]. It is thus not easy to associate the issue of the wheel-marked coinage to any political power. As it appears, the issue and circulation of the wheel-marked coins of various denominations were controlled by a powerful and prosperous commercial guild of the Gandhāra region—possibly with its headquarters and main mint at Taxila[39].

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[29] We have discussed in detail the question of the origin and evolution of 'testing marks' or countermarks in our paper in *JNSI,* XXXVIII, pp. 27 ff.

[30] *AI*, No. 1, pp. 31-32.

[31] See *BMC(AI)*, p. xvi.

[32] *Ibid.*, p. xvi.

[33] They include animal and other motifs, a symbol 'identical with that of the wheel-marked coins of the N.W. India and Afghanistan'. See *TMA*, pp. 37-38, Nos. 15-43 and Pl. III. 15-22 and Pl. IV. 23-43.

[34] *BMC(AI)*, p. xvi.

[35] *Ibid.*

[36] *Ibid.*, p. xvii.

[37] *AI*, No. 1, p. 31.

It is, however, quite concidental that the full, quarter and eighth pieces of the wheel-marked coins, as known to us, approximate the weights of double, half and quarter sigloi. But they had actually nothing to do with the weight-standard of the Persian coinage. The assumption that the Persian authority and influence prevailed over the territories where the wheel-marked coins were current as well as the apparent similarity of weights of the Persian and Indian coins under discussion evidently led Allan and his followers like Young and Bivar to hold that the wheel-marked coins were struck on a Persian standard. But it is difficult to accept Allan's view. For, had the authorities issuing wheel-marked coins been influenced by the weight-system of the Persian coins, they would first strike coins of the denomination of a full *siglos* (weighing 86·45 grains) and then think of coins of higher and lower denominations[40]. But that is not the case.

Unfortunately, Allan does not seem to have taken into consideration the very weights of the nine full British Museum specimens. Not to speak of the heaviest one which is 177·3 grains in weight, each of them (except No. 4 which is 'much worn') record a *weight which is invariably higher than the theoretical weight of two 'sigloi'*, i.e. 172·9 grains. Then, again, the bar-type full wheel-marked coins of the Chaman Huzuri Hoard known to record substantially heavier weights than the weight of two 'sigloi'; for while the average weight is as high as 179·65 grains, the heaviest one weigh 182·8 grains, *i.e.* ten grains more than the theoretical weight of two sigloi[41]. This would never happen had the wheel-marked bent bar-type coins been struck on the Persian standard and be equivalent to two sigloi. Instead of being overweight wheel-marked coins would then record lighter weights, never heavier ones. Any way, this comparative study demonstrates the fact that the wheel-marked coins and the Persian issues belonged to two distinct weight-systems.

In fact, the original weight of the wheel-marked coins was much heavier than that of two sigloi, and it was in the neighbourhood of 180 grains, which would be equivalent to 100 *ratis*, 1 *rati* being equal to 1·8 grains in weight.

Thus, as we see, the bent-bar or wheel-marked coins did not at all conform to the Persian, or for that matter any other foreign standard of weight. They were evidently—and unquestionably—of the standard of 100 *ratis*, as naively surmised by V. A. Smith, and duly upheld by E. H. C. Walsh and Durga Prasad[42]. For reasons discussed elsewhere we would call the full *bent* bar-typed coins of the wheel-marked category *Śatarati Śatamānas*[43].

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[38] Persian *siglos* and Wheel-marked coin have nothing in common: they sharply differ in type, style and mode of fabrication. See A. N. Lahiri, *JNSI*, XXXV, pp. 5-6.

[39] The existence of coins issued by trade-guilds in the area is proved by various later *negama* coins discovered in and around Taxila: see *BMC(AI)*, pp. cxxv ff. and pp. 214 ff. Then, Young has shown that Taxila had a mint for the wheel-marked coins: *AI*, No. 1, p. 31.

[40] When the Kushāṇa king Vema Kadphises adopted the Roman weightstandard for his gold coins, he struck 'full' *dīnāras* approximating the weight of the standard Roman gold coin—*denarius aureus*, besides striking double *dīnāras*, which the Romans did not issue. All successors of Vema Kadphises issued *dīnāras*, though double *dīnāras* were discontinued.

[41] See *TMA*, p. 37, Nos. 1-12.

[42] See *PMCT*, p. 3.

[43] *JNSI*, Vol. XXXVIII, Pt. II, p. 11.

NOTES ON A PORTRAIT OF AKBAR WORSHIPPING THE SUN

ASOK KUMAR DAS

THERE is an interesting portrait study of Emperor Akbar amongst the rich collection of Mughal miniatures in the Indian Museum, Calcutta. In it the Mughal emperor is shown standing bare-footed on a low platform and adoring the sun with folded palms. The posture is unusual for a Muslim emperor. Akbar was, however, an unusual person, having unorthodox and progressive views on religion, partly reflected in this unusual portrait study.

Akbar was deeply interested in religion and wanted to know as much as possible of all religions in his quest for a common religious ideal. For this unorthodox predilection he was regarded by early historians and uninformed contemporaries as an apostate from Islam, which is far from the truth. In fact, he was "an intensely religious person, or rather a person desparately in search of a religion".[1]

He started as a devout Muslim with an exaggerated veneration for the saints of the Khwaja Mu'in-ud-din Chishti's family and order. By 1575 or so the religious picture of Mughal India became somewhat confused after the death of Shaikh Salim Chishti and the resulting decline of Sufistic influence in the court. At that time Akbar was showing serious interest in other religions and invited teachers, scholars and missionaries of Hinduism, Jainism, Zorastrianism, Christianism and Judaism to the newly built *Ibadatkhana* at the new capital Fatehpur Sikri, for long and lively discourses and discussions and comparative study of all religions.

He showed genuine respect to the religious beliefs and sentiments of the vast majority of his subjects and wanted to find common grounds where mutual malices and animosities would not have any place. The influence of the 'Alfi movement current in India was also playing its part in his mind. Indications of a grand scheme to commemorate the event became apparent from the illustrated pages of the sumptuous illustrated manuscript of the *Tarikh-i-'Alfi* involving most of the leading scholars[2] and all the leading painters, now surviving in small fragments in different collections.[3] After all these exercises, he formulated a new kind of 'religion', the *Din-i-Ilahi*, and in 1581 promulgated it which 'asserted reason as the basis of the approach to religion, and prohibited sensuality, lust, misappropriation, deceit, slander, oppression, intimidation and pride.[4]

Among other things, the sect was highly preoccupied with light, sun and fire.[5] While tracing the origin of Akbar's predilection towards fire and the sun, it is noticed that three distinct factors contributed to it; the Hindu practice of burning '*homa*' or sacred flame by his Hindu consorts in their *Zanana mahals*[6] and the recital of the one thousand names of the sun;[7] the Zoroastrian practice of keeping a perpetual temple fire and the observance of all solar festivals;[8] and the Sufistic practice of honouring the sun.[9] Abu'l Fazl, however, declares that Akbar did not worship the sun as a god, but considered 'that exalted element, which is the source of man's life and his continued existence' as great.[10]

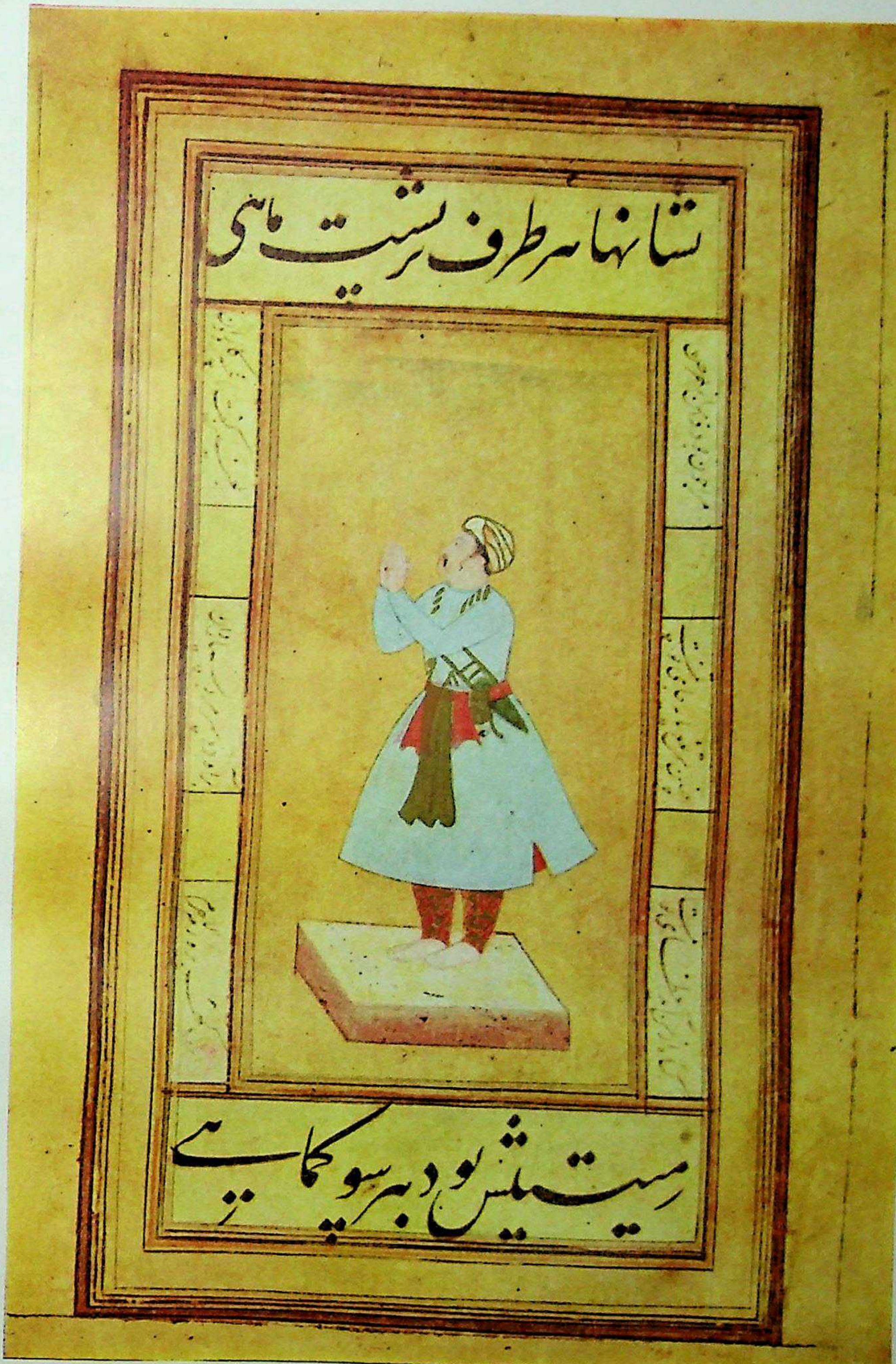
Akbar met the principal teacher of the Zoroastrian faith in India Dastur Mehrji Rana of Navasari in 1573 at the time of the seige of Surat and subsequently invited him to take part in the discussions of the '*Ibadatkhana* where the Parsee saint arrived in 1578.[11] Both the emperor and his principal counsellor-friend Abu'l Fazl learnt from him the details of Zoroastrian religion, and 'the virtues of the worship of the sun and fire'.[12] These details obviously impressed the emperor as he gradually learned towards solar monotheism. He started to wear robes of different colours on different days of the week according to the position of the stars in the sky. He woke up early in the morning and prostrated before the sun at the time of its rise and rose up respectfully with the whole court when the candles and lamps were lighted in the evening. According to Abu'l Fazl, the hours of Akbar's religious devotion or 'self-examination' were the sunrise, noon, the sunset and midnight. He requested the well-known Jaina scholar Bhanuchandra Upadhyaya, then resident in the court after the departure of the celebrated Jaina saint Muni Hiravijayaji, to explain the essence of the Jaina religion and also to compose a sun cult manual *Sūrya-sahasra-nāma*.[13] A disc was prepared for the emperor containing these 1001 names of the sun. At the time of his appearance in the *jharokhā* (salutation balcony) when all his subjects—rich and poor—cried *Allahu Akbar* in saluting him, he muttered these one thousand and one names of the sun.[14] Akbar's devotion to the sun was a part of his reverence for the Divine, and attempt to realise the greatness of its powers and the vastness of its benefit.[15]

It should be mentioned here that Akbar's son and successor Jahangir was no less eager to continue the Parsi practice of worshipping the sun. To him the sun had even greater import as he selected his *laqab*, the first name, as Nur-ud-din, the light of religion, the light which brightens the earth, brings benefit to mankind and a new meaning to religion.[16] Sun is the great light and the benefactor of the Universe, which he as its human counterpart should mirror in his own way. He wrote in his memoirs that his accession coincided with the rising on the earth of 'the great light, the sun'.[17] The importance given to the sun is also emphasized in the observance of the vernal equinox (*sharaf*), when Jahangir formally sat on the throne,[18] and the eclipses of sun and moon, after which he donated money and various other gifts to the poor and to the men of religion.[19] The motif of the resplendant sun was adopted in his banner. Some of his coins also show the sun used as a halo or independently.[20] A whole series of coins showing the signs of the zodiac was issued by him.[21] The Parsi festival of Nauroz was celebrated by Jahangir with great pomp and rejoicing. Elaborate preparations were made long before the beginning of the celebration which lasted for more than a fortnight. Important courtiers and nobles arranged colourful festivities when the emperor was entertained and presented with choice gifts, jewels, imported articles, etc. Jahangir bestowed gifts and conferred ranks and titles on his officials and nobles on this occasion.[22]

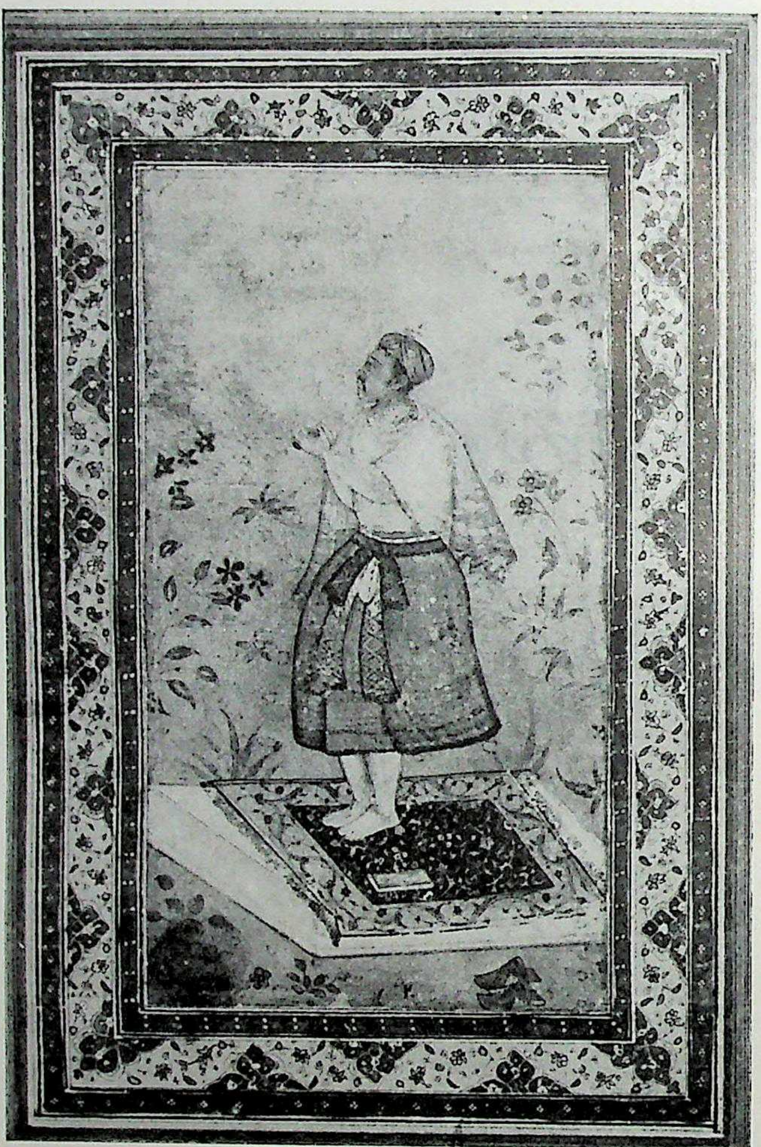
In the Indian Museum portrait a middle aged Akbar is shown standing barefooted on a low platform facing left (Plate 1).[23] His face is slightly tilted upwards and his hands are raised and folded in the act of adoration. His gaze is fixed towards the sun, part of which is visible in the upper left corner of the miniature. The emperor is wearing a light......coloured *jama* hanging below the knee joints, and a pair of tight-fittings trousers with golden design. A gold and white turban covers his head. A *khanjar* knife is tucked in the *patka* worn round his waist, while another *patka* with long richly designed *pallava* in gold and other colours is also worn by him. He wears a string of pearls; rubies and sapphires are shown near his feet on the platform. This appears to be the rosary carried by the emperor at the time of *jharokhā-darśan*, when he appeared in the morning before his subjects in the salutation balcony of his east-facing *Diwan-e-Khas* at Fatehpur Sikri.[24]

The picture is not signed. It is mounted on a *wasli* with two panels of well-written Nasta'liq calligraphy on its top and bottom and three each of smaller letters on either side. Stylistically the portrait is un-

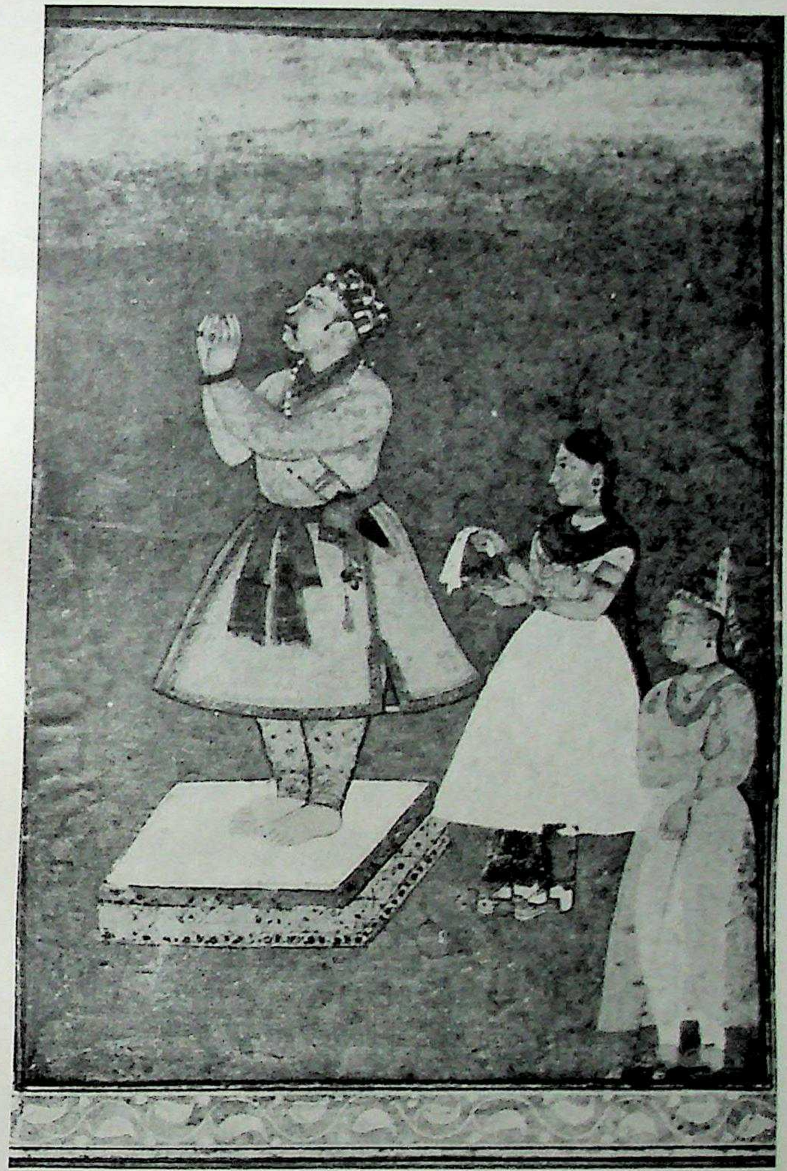
PLATE 1



Emperor Akbar worshipping the Sun
Mughal, *c.* 1600 A.D., Indian Museum Calcutta

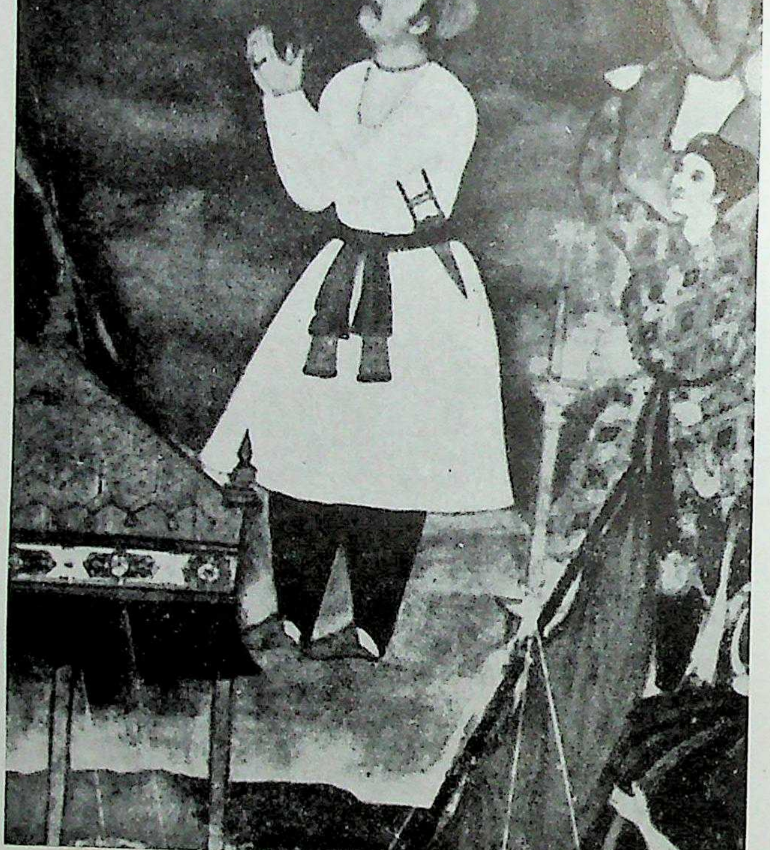


Emperor Akbar worshipping the Sun
Mughal, *c.* 1588-90; 115 mm. × 64 mm.
Courtesy: Sotheby, Parke, Bernet & Co., London



Emperor Akbar worshipping the Sun
Mughal, *c.* 1640-50 A.D.
Courtesy: Sotheby, Parke, Bernet & Co., London

PLATE 4



Emperor Akbar saluting at the riverbank on the march towards Bengal in 1575
From the *Akbarnama*, *c.* 1590. Crown copyright

interesting and lacks the spontaneity and liveliness of a remarkable study of Akbar in a similar posture of worshipping the sun (plate 2), sold at the Sotheby's London sale rooms in 1976.[25] The latter also shows Akbar worshipping the sun standing on a low white platform covered with a floral carpet of delicate design. He wears a golden turban and a blue mid-cuff length *dhoti* with two coloured *patkas*, a white shawl with gold borders draped around his shoulders. He does not carry the customary *khanjar* or *katar*. His slippers and a bound book are placed at his feet. The resplendent sun is partly visible in the upper right corner of the miniature. Unfortunately, the author of this remarkable study is not known as the miniature is unsigned, though his style is comparable with the finest studies of masters like Basawan.

The theme appears to have become a stock motif as we came across another study of Akbar in the same posture of worshipping the sun (plate 3).[26] This time two additional figures of female attendants have been included. In all other respects the details are comparable with the Indian Museum study. It does not show the rosary at his feet, and the emperor looks older and stunted in this later painting. We know of another important Mughal miniature showing Akbar in a similar posture (plate 4).[27] This well-known miniature from the *Akbarnama* series in the Victoria and Albert Museum illustrates the scene of Akbar saluting at the river bank on the march towards Bengal in 1575. There is no trace of the sun in this miniature though the face of the emperor is pointed towards the sky, obviously to thank the divine body.

NOTES

[1] Aziz Ahmed, *Studies in Islamic Culture in the Indian Environment*, Oxford, 1964, 167.

[2] Abu'l Fazl Allami, *A'in-i-Akbari*, tr., H. Blochman, I, Calcutta, 1927, p. XIL; Abdul Qadir Badaoni, *Munkhab-ut-Twarikh*,
II, tr., W.H. Lowe, Calcutta, 1884-5, *passim;* Milo Beach, *Imperial Image*, Washington, 1981, 91-99; etc.

[3] M. Mahfuj-ul-Haq, 'Discovery of a pair of the original illustrated Manuscript of *Tarikh-i-Alfi* written for the Emperor
Akbar', *Islamic Culture*, v. 1931, 462-71, 2 ills; B. Gray, 'An Early Mughal Illuminated Page', *British Museum Quarterly*,
VIII, 1934, 149-51; Milo Beach, *op. cit.*, 94-99 (for a complete list of all known pages).

[4] Aziz Ahmad, *op. cit.*, 171 quoting Muhsin Fani, *Dabistan-i-Mazahib*, I, 83.

[5] For fuller details: M. L. Roychoudhury, *The Din-i-Ilahi or the Religion of Akbar*, Calcutta, 1941; R. Krishnamurti, *Akbar*
the Religious Aspects, Baroda, 1961, Chapter VIII; S. A. A. Rizvi, *Religious and Intellectual History of the Muslims in Akbar's*
Reign., New Delhi, 1975; Aziz Ahamd, *op. cit.*, etc.

[6] Badaoni, *op. cit.*, 261.

[7] *Ibid.*, 268-69; 'From early youth, in compliments to his wives, the daughters of Rajahs of Hind, he had within the female
apartments continued to offer the *hom*, which is a ceremony derived from Sun worship, but on the New Year of the
25th year after his accession he prostrated himself both before the Sun, and before the fire in public, and in the even-
ing the whole court had to rise up respectfully when the lamps and candles were lighted...On the festival of the eighth
day after the Sun's entering Virgo in this year he came forth to the public audience-chamber with his forehead marked
like a Hindu and he had jewelled strings tied on his wrists by Brāhmaṇs by way of blessings..?

[8] *Ibid.*, 268-9.

[9] Aziz Ahmad, *op. cit.*, 178-79; *Ain-i-Akbari*, I, 50; Sri Ram Sharma *The Religious Policy of the Mughal Emperors*, Bombay,
1972, 59-60; etc.

[10] *Ain-i-Akbari*, I, 43; 'Why should considering the exalted elements, which is the source of man's life and his continued exis-
tence, great, be held improper?'

[11] J. J. Modl, *The Parsees at the Court of Akbar and Dastur Mehraji Rana*, Bombay, 1903; S.A.A. Rizvi, *op. cit.*, 129-31.

[12] Badaoni, *op. cit.*, 260-1.

[13] Hirananda Sastri, 'Akbar as a Sun-Worshipper', *Indian Historical Quarterly*, IX, 1933, 137-140; Fr. A. Monserrate, *Commen-*
taries; tr. & ed., J. S. Hoyland and A. C. Chatterjee, Oxford, 1922, 183-4.

[14] Badaoni, *op. cit.*, 306, 356, 363.

[15] Asok Kumar Das, *Mughal Painting During Jahangir's Time*, Calcutta, 1978, 16-17, etc.

[16] For details, *vide* Das, *op. cit.*, Chapter 1.

[17] *Tuzuk-i-Jahangiri*, tr., A Roger & ed. H. Beveridge, London, 1909, I, 2-3.

[18] *Tuzuk*, I, 90, 168, 206, 236-7, 261, 284, 320, 373, etc.

[19] *Tuzuk*, I, 183, 281-2.

[20] S. H. Hodivala, "Portrait Muhrs" of Jahangir, *Historical Studies in Mughal Numismatics*, Bombay, 1976, Chapter XI, Bamber Gascoigne, *The Great Mughals*, London, 1971, col. pl. 139.

[21] Bamber Goscoigne, *op. cit.*, col. pl. 140; S. H. Hodivala, 'The Zodiacal Coins', *Historical Studies*... 171-2.

[22] *Tuzuk*, *passim* (*vide*, note 18).

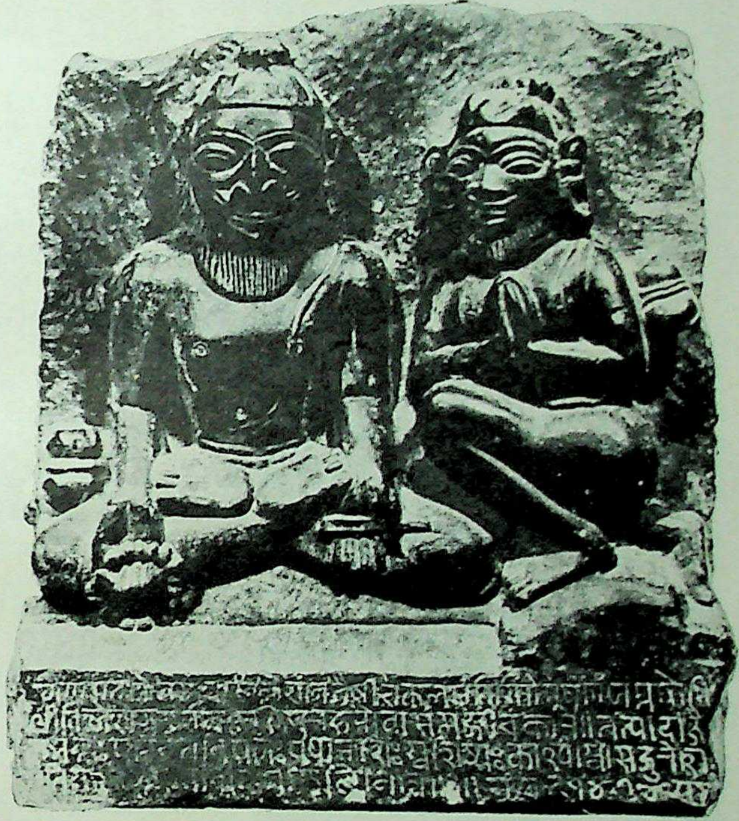
[23] Indian Museum, Acc. no. D. 1/N.S. 129, size 37·7 cm. × 23 cm. with mount.

[24] R. Nath, 'The Diwan-i-Khas of Fatehpur Sikri: A symbol of Akbar's Belief in Surya Purusa', *Some Aspects of Mughal Architecture*, New Delhi, 1976, 16. Dr. Nath has made a scholarly and thorough analysis of the architectural edifice of the building now known as *Ibadatkhana* and in this context discussed Akbar's belief in Sun worship (pp. 13-16) and the symbolism of the Central pillar of this building.

[25] *Sotheby Sale Catalogue*, 12 April, 1976, Lot 74. Painting size 115 mm × 64 mm; I am grateful to Mrs. Margarat Erskine for supplying the details of the important miniature. The present whereabouts of the painting is not known to me.

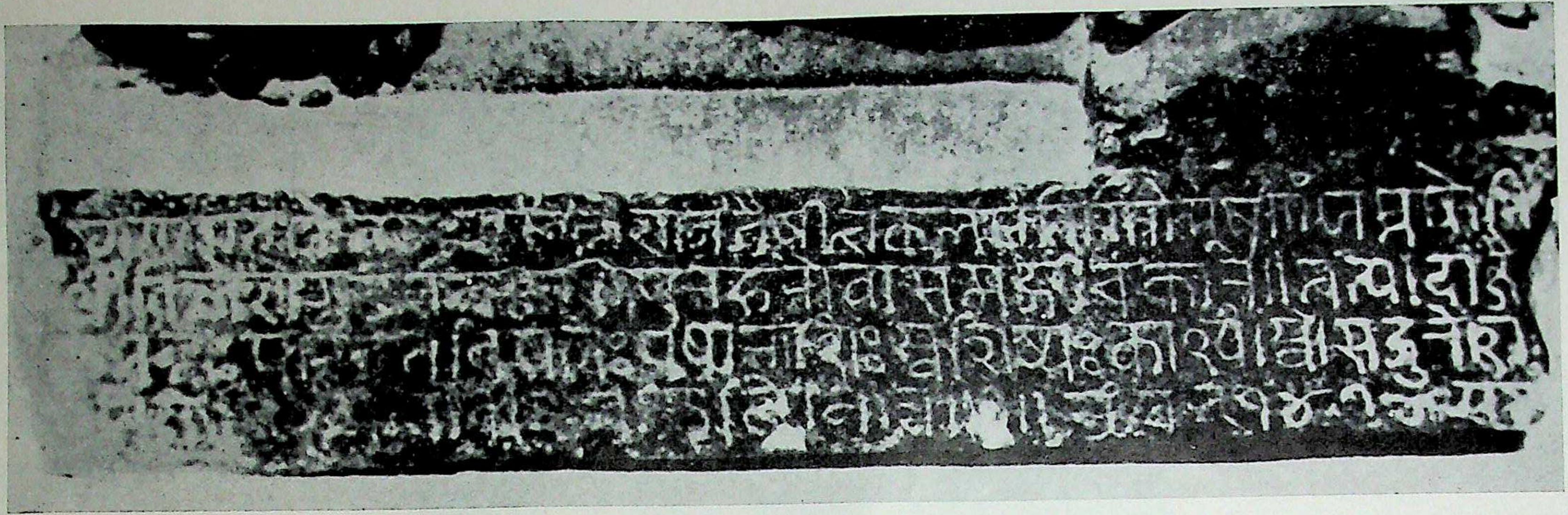
[26] Put up for sale at the Sotheby's a few years back. Present whereabouts not known to me.

[27] Victoria and Albert Museum, No. 2, 1896 & S. 101/117; Rep: E. Wellesz, *Akbar's Religious Thought Reflected in Mogul Painting*, London, fig. 25. The painting is the work of Lal (drawing) and Nand, son of Ramdas (colouring).



Sculpture showing Vyāsa and his disciple

PLATE 2



Vyāsaguru image inscription of Saṁvat 1414

THE VYĀSAGURU IMAGE INSCRIPTION OF SAMVAT 1414, IN THE OKURA SHUKOKAN MUSEUM, JAPAN

SHYAMALKANTI CHAKRAVARTI

IN October, 1983 while I was in Japan visiting different museums of the country on an invitation of the Asian Cultural Centre for Unesco, I made it a point to survey Indian collections as displayed in the Japanese museums. On October 23, I visited the Okura Shukokan Museum, a forerunner of privately financed institutions of its kind in Japan, situated at Toranomon, Minato-ku, Tokyo. The museum holds Japanese, Chinese, Thai and Indian art objects in its collection. Of about eight stone sculptures of Indian origin, Buddhist images of Pāla-Sena period are noteworthy. These sculptures represent Padmapāṇi Avalokiteśvara, Vajrasattva, Tārā and Buddha. Of two Brahmanical icons of mediaeval Indian art deposited in the museum, a slab of stone carved with two seated figures labelled as 'high priest and disciple' bears a four-line inscription on its pedestal. I received a photograph of the inscribed image the next day through my friend Mr. Shoji Ito, for examination and decipherment. I am grateful to Mr. Eizo Okura, the Director of Okura Shukokan Museum, Tokyo for his kind arrangement of my visit in the Museum with Mr. Akio Haga, Editor, Art Book Department Kodansha Ltd., Tokyo.

The image in question was described very briefly in the catalogue of 'Selected 500 items of the Okura Shukokan Museum' published in 1979 by the Okura Cultural Foundation, Tokyo. The catalogue describes the image as the following:

> "No. 327: High priest and disciple, h. 33·0 w. 29·0 (apparently, cm.), India, 17th C., stone".

The catalogue, however, fails to inform that the image is inscribed. But before making an attempt to read this inscription let us describe the sculptural part of the slab in question, which covers about three-fourth portions of the total carving. (Plate I) The two bearded figures seated in different fashion apparently represent ascetics. The one represented frontally is shown sitting cross-legged, holding rosary (*akṣamālā*) in right and a book (*pustaka*) in the left hands. The ascetic is seen meditating and counting the beads of the rosary. He is flanked by an auspicious water vessel (*kamaṇḍalu*) to his right and a disciple to his left kneeling down in reverence with folded palms. Both of these saintly figures are bare-bodied, wearing the scared thread (*yajñopavīta*) and matted hair tied with knots. They also display long beards, lengthy earlobes and moustaches. Behind the figure represented in three-quarter profile, apparently clinging to its back is a beggar's bowl or a water vessel. The ascetic in meditation is sitting on a raised pedestal while his disciple is squatting on an uneven surface of a stone slab. The meditating saint may be identified with Vyāsa, the illustrious author of the *Mahābhārata* who according to the tradition of the *Skandapurāṇa*, once had to undergo a test of his devotion towards Hara and Pārvatī, while taking resort to Kāśī. In the 95th chapter of the Kāśī section in the *Skandapurāṇa*, it is said that Vyāsa, son of Parāśara came to live in Kāśī along with his disciples. He was joyfully passing his time there engaged in reciting panegyric hymns about Śiva. His disciples were begging alms going door to door at Kāśī. On hearing about Vyāsa, who was all the time glorifying the city of Kāśī—the devine abode on earth of Hara Pārvatī, the consort of Śiva instructed people of Kāśī not to offer any more alms to his disciples, so that at one time being disgusted the starving Vyāsa would yield, speaking ill of Kāśī and its inhabitants. The assumption came true and Vyāsa's allegiance and devotion to Śiva was tested. He was forbidden entry to Kāśī forever. Vyāsa then taking resort to the other side of the river Ganges, kept himself engaged in the worship of a *liṅga* called after his name 'Vyāseśvara' set up in front of the Ghaṇṭākarṇa lake. There he was seen besmeared with ashes and bedecked in ornaments of rosary engrossed in studies of the text of the Rudrasūkta.* This description of Vyāsa in the *Skandapurāṇa* is in quite consonance with the figure here chiselled out in stone. Therefore, the image in the Okura Shukokan Museum depicts Vyāsa, the compiler of the *Mahābhārata* and his disciple in attendance. The contents of the four-line inscription also give us the same identification.

The inscription (Plate II) in the Nāgarī character of the 14th century has four lines of writing. The inscription is in good state of preservation except some letters being effaced off partially. The last line records apparently the name of the man who had installed the image. Thereafter the date in 1414 samvat, corresponding to 1357 A.D. is represented numerically. The inscription, however, begins with a salutation to Gaṇeśa, followed by an eulogy to this god. The third line of the inscription then refers to the installation of the image of Vyāsaguru along with his disciple. We now read the text as the following:

Text

Line I Gaṇapataye namaḥ/asantokhānaṁ traiṣṇārttakalasam-trigiro(n) bhūṣaṇaṁ japtapobhi(ḥ)
Line II Śrī Vighneśagajalamvaḥ tripuraharovāsamaṅgīcakāra//tatpādāvjai=
Line III Kasannaḥ prasphuṭitavipulaḥ puṣparāśiḥ svaśiṣyaḥ kāśyāṁ yvāsa (Vyāsa) jurośa
Line IV pratisṭhāpita (Śrī Lakṣmaṇa?) iti nāmnā//samvat 1414 śam

Translation

Obeisance to Gaṇapati. The lord of obstacles who took resort to the elephant (body), has now through penance and meditation assumed the form of Tripurari and who is (as it were) a pitcher to the thirsty and frustrated (votaries) and who is adorned with threefold speeches (i.e. scriptures).

Meditating at his lotus feet with heaps of full-blown flowers, (an image of) Vyāsa, the guru with his disciple at Kāśī is installed by one who has (Śrī Lakṣmaṇa?) as his name. Samvat 1414. Let peace be with you.

As regards the provenance of the image the museum-records do not throw much light. Stylistically, the sculpture might hail from Kashmir, Himachal Pradesh, North Bihar or from some other region in the Himalayan Terrai. The language in the inscription is somewhat corrupt Sanskrit. However, the word 'juro' is generally found used in the Himalayan valley and in particular in Newari language. This fact also subscribes to our view that the image might have been carved somewhere in the Himalayan valley in the 14th century of the Christian era. In fine, possibly there is no extant image of Vyāsa, the compiler of the great epic in India, with inscription rendering clue to its identification. The Okura Shukokan Museum stone image, therefore, holds a unique position both in iconographic and epigraphic context.

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*Pārāśaryyastadārabhya śambhubhaktiparobhavat/
Liṅgaṁ Vyāseśvaraṁ sthāpya ghaṇṭākarṇahradāgrataḥ//68//
Bibhūtibhūṣaṇo nityaṁ nityaṁ rudrākṣabhūṣaṇaḥ/
Rudrasūktaparo nityaṁ nityaṁ liṅgārccakobhavat//69//
—Skandapurāṇam, Kāśikhaṇḍam, 95 adhyāya, 68-69 śloka.

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A SECOND DATED TĀRĀ IMAGE OF THE REIGN OF DEVAPĀLA

GOURISWAR BHATTACHARYA

THE dated images (both of metal and stone) of the reign of the Pāla rulers of Bihar-Bengal (*c.* 750-1200 A.D.) are only a few.[1] Besides the stone door-lintel containing the figures of Sūrya, Lakulīśa and Viṣṇu, dated in the 26th regnal year of the Pāla ruler Dharmapāla (= *c.* 801)[2] and found at Bodhgayā[3], the earliest single stone figure[4] is the well-known Tārā from Hilsā in the Patna District of South Bihar. The figure is at present preserved at the Patna Museum, No. Arch. 6014.[5] The inscribed Hilsā Tārā was published by Surendranath Majumdar-Sastri in the *Journal of the Bihar Research Society*, vol. X (1924), pp. 31-36 with a plate. Majumdar-Sastri, who gave a transcript of the inscription together with an English translation of the text, read the date as 35 of the regnal year of Devapāla. The record which is divided into three parts, gives the well-known Tārā-dhāriṇī[6] on top which is followed by the Buddhist creed (dharma-paryāya) *ye dharmā* etc. engraved on the lotus petals on which the deity sits, and finally the dedicatory text written on the pedestal below. This text is important, because it gives the regnal year of the ruling monarch Devapāla (also mentioned) and names the famous Buddhist teacher Mañjuśrīdeva of the Nālandā-Mahāvihāra and the donator, the devout Buddhist worshipper Gaṅgādhara. Majumdar-Sastri's reading of the correct date 25 as 35 is wrong[7] and also wrong his equation of the *Siddham* symbol with *Om*.[8]

As this Tārā image is of iconographical interest we give a short description of it. The image is a relief work measuring only 39 cm. in height. Unfortunately the face, breasts and the left hand of the image are damaged (see plate I). Contrary to the earlier stone figures of the Pāla period which are a bit plumpy with a flat face, this figure is quite slim and the damaged face is pointed. The deity sits in *lalitāsana* on a double-petalled lotus which is placed on a *triratha* pedestal, that is to say her right leg hangs down from the seat, the foot being placed on a small lotus, and the bent left leg rests on the seat. With her right hand she shows *varada-mudrā* and with the left hand (damaged) she holds the stalk of *nīlotpala* (blue lily) with flower and a bud. A circular object (perhaps a lotus) is shown behind the hand. The palm of the hand is turned inwards, which is an earlier position of hand of the Buddhist deities to hold a flower-stalk.[9] Her hair is tied to a bun and placed above her head. This is also an earlier type of hair-style.[10] A diadem with a triangular element in the middle is tied around her head. On both sides of her head the ends of fluttering ribon with which the diadem is tied, are shown. This is a clear Sassanian influence. A few locks fall on her shoulders. Very striking is the fact that she wears two types of ear-rings. This is also an early sign of dating the Pāla images. We don't find this speciality in the images of Bihar-Bengal after the 9th century A.D. The deity wears various jewelries and a long sacred thread stud with pearls (*muktāhāra-yajñopavīta*). Quite interesting are the tassels of her girdle, the ends of which are shown below her left leg. The middle one of these contains the usual Pāla-type lance-shaped element and the two others have bells. She wears a scarf and a skirt marked with double lines with flowers in between. The deity sits in a niche made of two pillars and an ornamental arch above that. There are Makara-heads on both the ends of the arch. On top of the arch in the middle there is *kīrtimukha*. The whole back-plate has been treated as *prabhāmaṇḍala* with a design of flame which is quite unusual. The deity is Tārā (as mentioned in the record and also as she is represented), the most important female deity of the Mahāyāna pantheon. Tārā is accompanied here both by a female and male figure, both seated, although the sitting postures are different. The female figure at the proper right appears to be four-armed. With her front hands she holds *kartri* and *kapāla* and with both the back hands the elephant-hide with the severed head of the animal.[11] Most probably she is Ekajaṭā.[12] The corpulent male figure at the proper left holds *paraśu* in the left hand, while his right hand is in *abhaya-mudrā*. He wears a large *jaṭābhāra* and most probably he has a circular third-eye on the forehead. He appears to be Hayagrīva, although the small horse-head is missing in this figure.[13] Below the pedestal sits perhaps the donor (damaged) with *añjali-mudrā* and in *vīrāsana*. The recess of the pedestal is marked with lotus-root and ornamental lotus foliage with buds.[14]

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[1] For a list of the dated images of the Pāla period see Susan Huntington, The "Pāla-Sena" schools of sculpture. *Studies in South Asian Culture*, volume X, Leiden, 1984, pp. 218 ff.

[2] For the Pāla chronology, see D. C. Sircar, The Pāla chronology reconsidered, *ZDMG*, Supplement III, 2, Wiesbaden, 1977, pp. 964 ff., also, *Jour. Anc. Ind. Hist.*, vol. IX, pp. 209-10. Sircar has recently slightly changed this chronology in view of the dated Balarāma bronze image from Rājgīr in the 37th regnal year of Rājyapāla. See his Bengali work, *Pāl-Sen juger baṁśānucarit.*

[3] See R. D. Banerji, *Eastern Indian School of Mediaeval Sculpture*, Calcutta, 1933, pl. I(a). For the inscription, see A. K. Maitreya, *Gauḍalekhamālā*, Rajshahi, 1319 B.S., pp. 29-30.

[4] For the deity Madhuśreṇika donated in the reign of Dharmapāla, Sircar himself has doubt. See Three Inscriptions from Valgudar, *Ep. Ind.*, vol. XXVIII, pp. 144-145. See also Huntington, *op. cit.*, p. 221, No. 6.

[5] See Banerji, *op. cit.*, pl. II(b); Parameshwari Lal Gupta, *Patna Museum Catalogue of Antiquities*, Patna, 1965, p. 63, No. 58; also Huntington, *op. cit.*, p. 223, No. 12.

[6] See *Sādhanamālā*, vol. I, Sādhana 89 etc.

[7] See S. N. Chakravarti, Development of the Bengali Alphabet etc. in *JRASB*, Letters, vol. IV, 1938, p. 390. Huntington informs us that in a letter to her dated 12.2.1981 Sircar confirmed the date as 25, See, *op. cit.*, p. 224.

[8] See Sircar, Introduction to Indian Epigraphy and Palaeography, in *Jour. Anc. Ind. Hist.*, vol. IV, pp. 128-29; G. Bhattacharya, Siddham, Svasti and Om—Invocations in Epigraphs and Manuscripts, *ZDMG*, Supplement IV, Wiesbaden, 1980, p. 474.

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[9] Compare Banerji, *op. cit.*, pl. X(c); Stella Kramrisch, Pāla and Sena Sculpture, in *Rupam*, No. 40 (1929), fig. 19.

[10] See Claudine Picron, Les steles Pala-Sena: Evolution et Chronologie, in *Au Service d'une biologie de l'art,* Université de Lille III, p. 64. Madame Picron (now Frau Bautze) has made a very careful stylistic analysis of the Pāla-Sena stone sculptures belonging to four periods.

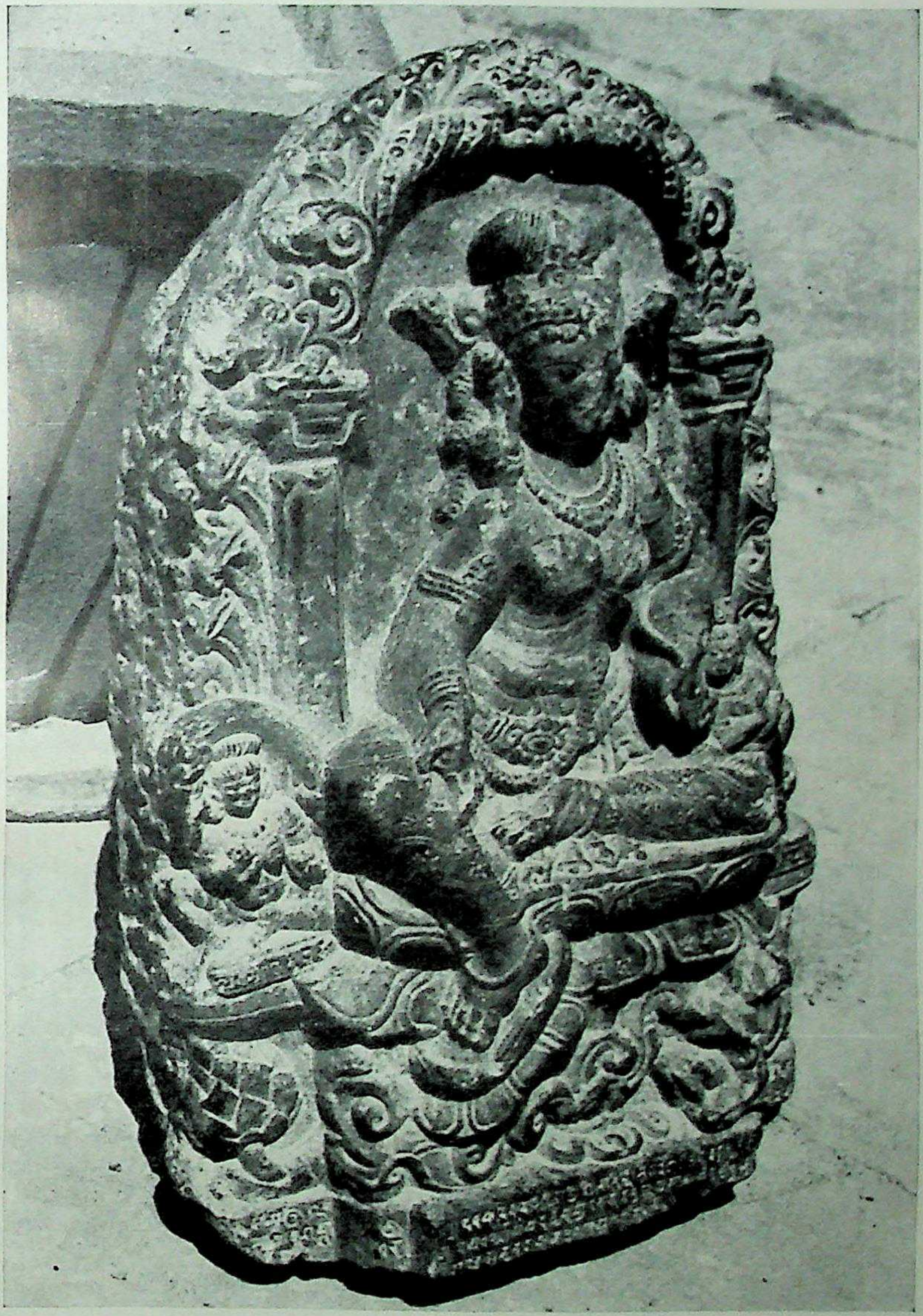
[11] For a simialr figure, see the inscribed, damaged image of Tārā from the Indian Museum, Calcutta, No. 3820, also from South Bihar and is to be dated in the 8th-9th century A.D.

[12] In the Indian Museum figure of Tārā, No. 3820, the four-armed attending seated figure holding aloft the elephant-hide with the two upper hands and *kartri* and *kapāla* in the lower two hands, has also been tentatively identified as Ekajaṭā by Mallar Ghosh in her praise-worthy doctoral thesis, *Development of Buddhist Iconography in Eastern India: a Study of Tara, Prajñās of Five Tathāgatas and Bhṛkuṭī*, New Delhi, 1980, P. 51. But she has not been able to find out a description of Ekajaṭā holding the elephant-hide. Most probably Ekajaṭā is a corresponding female from of Sambara. Ekajaṭā is a form of Blue Tārā. See B. Bhattacharyya, *The Indian Buddhist Iconography,* 2nd ed. Calcutta, 1958, p. 309. As an attending figure Ekajaṭā is described as two-armed and holding *kartri* and *kapāla*, see *Sādhanas* 91 and 116. And as an independent deity she is described in several *Sādhanas*. In No. 123, she is twelve-faced and twentyfour-armed. In 124, she is four-armed and holds in the front left hand *kapāla* and in the front right hand *kartri*, *utpala* in the back left hand and *khaḍga* in the back right hand. In 125 she holds *ambhojabhājanam* in the front left hand and *kartri* in the front right hand, *utpala* in the back left hand and *khaḍga* in the back right hand. No. 126, gives similarly *khaḍga* and *kartri* in the right hands and *utpala* and *kapāla* in the left hands. No. 127, describes at first two-armed Ekajaṭā holding *kartri* and *karoṭa*, then four-armed deity holding *śara* and *śaṅkha* in the right hands and *cāpa* and *karoṭa* in the left hands. The third one is eight-armed holding *khaḍga*, *śara*, *vajra* and *kartrikā* in the right hands and *cāpa*, *utpala*, *paraśu* and *karoṭa* in the left hands. No. 128, describes Śukla-Ekajaṭā with two arms, holding *akṣamālā* in the right hand and *nīlotpala-kalikā* in the left hand.
In *Sādhana* 174, the four-armed Ekajaṭā accompanying Kurukullā is described as holding *vajra* and *aṅkuśa* in the right hands and *ghaṇṭā* and *pāśa* in the left hands.
It is interesting to note that in none of these descriptions Ekajaṭā is described as holding the elephant-hide.
On Ekajatā, see also K. R. Van Kooij, Some iconographical data from the Kālikā Purāṇa with special reference to Heruka and Ekajatā, in *South Asian Archaeology,* 1973 (ed. van Lohuizen de Leeuw and Ubaghs), pp. 167-70, pl. 82. Ekajatā is shown painted on a Tibetan thanka accompanying Tārā. Van Kooij describes her in the following way (pp. 167-68), "She is standing on a lotus, wearing the tiger's skin round her loins and in addition an elephant's skin. Her legs are crossed, her left hand holds a *kapāla*, she laughs in an unpleasant way, has three eyes and is provided with dark-blue colour."

[13] According to the *Sādhanamālā* Hayagrīva is said to accompany Avalokiteśvara in his *Khasarpaṇa* aspect (*Sādhana* 14). He is described as a terrifying deity wearing a tiger-skin and a snake as *yajñopavīta* and holding a staff (*daṇḍa*) in the left hand and showing *vandanābhinayī mudrā* with the right hand.
Sādhana 15, describes him also wearing a tiger-skin, a snake as ornament and holding a staff.
Sādhanas 259 and 260, give description of Hayagrîva as independent figures.
The *Sādhanamālā* does not give any description of Tārā with Ekajaṭā and Hayagrīva. The Khadiravaṇī-Tārā is accompanied by Aśokakāntā-Mārīcī and Ekajaṭā (*Sādhana* 89). The Varada-Tārā is accompanied by Aśokakāntā, Mahāmāyūrī, Ekajaṭā and Āryā-Jāṅgulī (*Sādhana* 91). The Sita-Tārā is accompanied by Mārīcī and Mahāmāyūrī (*Sādhana* 104), etc.

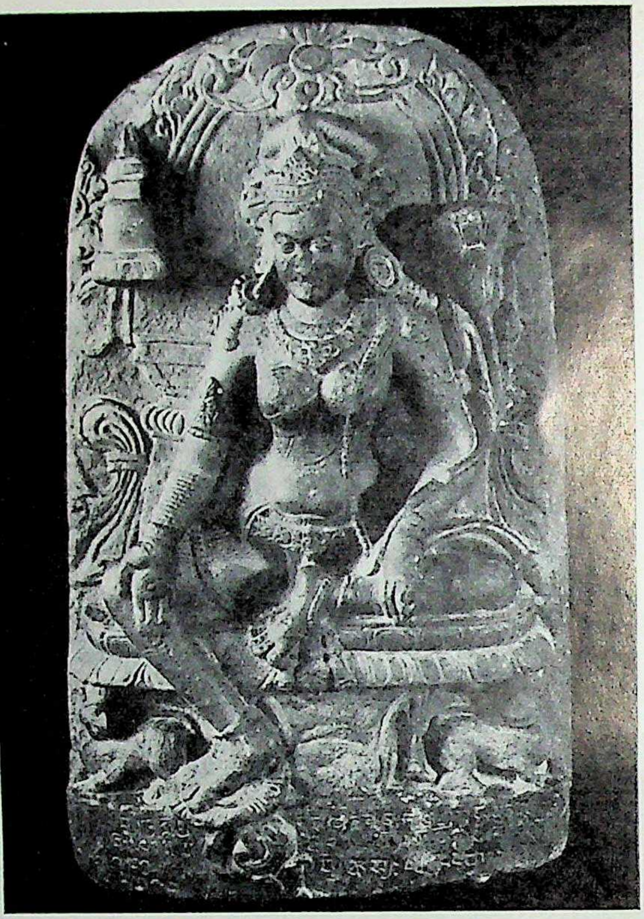
[14] We have not come across any seated Tārā figure with this combination. But there are several standing two-armed Tārās with Ekajaṭā and Hayagrīva. Of them two are at the Bodhgayā Site Museum, the third, but most beautiful one (with a restored face) is at the Sotheby's collection (see catalogue, 27th Feb., 1967, No. 58, p. 29) and the fourth one from Nālandā is at the Indian Museum [see Banerji, *op. cit.*, pl. XXXIX(c) and Saraswati, *Tantrayāna Art,* No. 104].

PLATE I

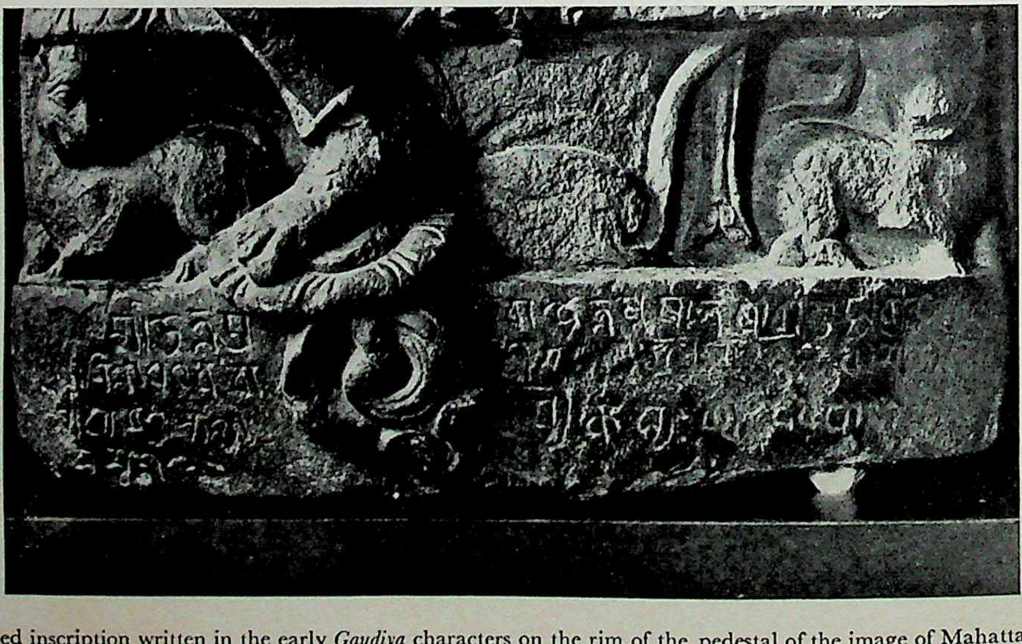


The well-known Tārā image from Hilsā in the Patna District

PLATE 2 & 3



The image of Mahattarī-Tārā from Nalanda now lying in a private collection of West Berlin



Four-lined inscription written in the early *Gauḍiya* characters on the rim of the pedestal of the image of Mahattarī-Tārā

Very recently we have come across with another stone image of Tārā also dated in the reign of Devapāla. This figure is lying in a private collection of West Berlin and was exhibited here.[15] This figure measuring 61 cm. in height appears to have been originated also at Nālandā (see Plate II). Aesthetically and from the point of sensuousness this figure is more attractive than the Hilsā figure. Unfortunately this figure is also slightly damaged. The deity sits in the same position on a double-petalled lotus which is placed in this case on a lion-throne (*siṁhāsana*), the lions being shown at each corner. She wears the similar jeweleries and the two ear-rings are also different. The hair-style and the diadem are similar. The tassels of the girdle have the similar lance- and bell-heads and are placed below the left foot of the deity. On the palm of her right hand which is in *varada-mudrā*, there is an auspicious mark with a flower. The left hand which holds the utpala-stalk is also turned inwards. The only difference can be noticed in the piece of the lower garment (no doubt connected with the knot) which is tucked to the proper right side of the waist in this figure, while on the other figure it is tucked to the proper left side. Below the lotus on which the deity sits, hangs down a piece of cloth in this case. Besides, this deity does not sit in a niche but reclines against the back-rest of a throne formed of a horizontal (damaged) and two vertical bars. Two ornamental elements (jewels?) are shown each above the horizontal bar. A votive *stūpa* appears now on the proper right side of the deity on top. *Prabhāmaṇḍala* is shown with a half circle formed with bands and ornamental design of flames behind the head of the deity. Instead of *kīrtimukha* (of the other figure) there is a "sprawling lotus" in the middle of *prabhāmaṇḍala*. Two banners are tied each to the vertical bar of the back-rest of the throne. This deity is not accompanied by any attending figure.

Below, on the rim of the pedestal there is a damaged, four-lined inscription written in the early *Gauḍīya* characters. The importance of the record lies in the fact that it is dated in the 31st regnal year of the Pāla ruler Devapāla *i.e.* 841 A.D. (see plate III). It is therefore, the second dated stone figure of the reign of the Pāla ruler. But while the record on the Hilsā figure starts with the date, in this figure it ends with the date. The characters of the Hilsā record show earlier types than those of the present one. The letter half *t* is written differently in the two records. The second record is no doubt more interesting as regards palaeography, it shows later development. It starts with the Buddhist creed *ye dharmā* etc. followed by the name of the donator, the devout worshipper Aryyaka.[16] The name of the ruler *Śrī*-Devapāla occurs after it (line 3) together with *Samvat* 31.

Now the problem is how shall we call these two Tārā figures? The Hilsā Tārā cannot be called Khadiravaṇī-Tārā because instead of the prescribed Aśokakāntā-Mārīcī she has Hayagrīva as accompanying figure. The *Sādhanamālā* does not describe any Tārā with Hayagrīva.

The second Tārā, on the contrary, may be called Mahattarī-Tārā according to *Sādhana* 90 of the *Sādhanamālā*.[17] The designation Śyāmā Tārā, usually given to this type of figure, does not exist in the *Sādhanamālā*.[18]

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[15] See the exhibition's catalogue of the Art Council of Berlin-Tempelhof: *Tantrische Kunst des Buddhismus*, Berlin, 1981, No. 20, p. 124. The figure has been described as Śyāmā Tārā in the catalogue.

[16] I am not absolutely sure about the correct reading of the name.

[17] Only the difference being that the Mahattarī-Tārā sits in *paryaṅkāsana* while our deity sits in *lalitāsana*.

[18] Generally Tārā is of green complexion and that's why she is described as *śyāmavarṇā*, compare *Sādhanas* 91, 92, 98. B. Bhattacharyya divides Tārās into five groups according to their colours, following Alice Getty: A. Green Tārā, B. White Tārā, C. Yellow Tārā, D. Blue Tārā, E. Red Tārā. See Bhattacharyya, *op cit.*, pp. 307 ff. Under Green Tārā he gives the following lists: 1. Khadiravaṇī Tārā, 2. Vaśya Tārā, 3. Ārya Tārā, 4. Mahattarī Tārā, 5. Varada Tārā, 6. Durgottāriṇī Tārā, 7. Dhanada Tārā, 8. Jāṅgulī, 9. Parṇaśabarī. See also Mallar Ghosh, *op. cit.*, pp. 35-36.
It was N. K. Bhattasali, who described the Aṣṭamahābhaya-Tārā from Sompārā, now at the Dacca National Museum, No$\frac{1.\ \mathrm{B.}\ (\mathrm{v})\ \mathrm{a}}{2}$ as Śyāmā Tārā. See *Dacca Museum Catalogue*, pp. 56-57 and pl. XXI.

SPOTLIGHTS ON SOME ENDANGERED MAMMALS OF THE NORTHEAST INDIA

AJIT KUMAR MUKHERJEE

THE northeast region of India presents a bewildering wealth of plants and animals. The topography of this region which is largely made of Tertiary mountains together with river valleys and the high humid tropical climatic conditions, sustain a biotope to support largely evergreen forests as well as temperate and alpine vegetations. The riparian flats of the Brahmaputra and Surma valleys which get inundated every year by flood water of the rivers arising from the North, Northeast and East montane complex, support thick grassland, meadows, marshes and swamps besides tree forests.

The northeastern region of India is of immense biogeographical interest. In the Post-Tertiary Period geological upheaval resulted in the emergence of the Himalaya and gradual disappearance of the eastern arm of the Tethys Sea. Such geological catastrophy brought forward appreciable alterations in the biotic composition since the Himalaya served as a great barrier-wall which helped in establishing different climatic conditions. The receding sea opened up a valley for the drainage of newly sprouting streams and rivers. A new gateway in the northeast was established for such species which attempted to escape from the rigors of glaciation in the North, Central and East Asia for their survival. The newly established warmer tropical region of the northeastern and Peninsular India being congenial to several species became a new and permanent abode. Such immigrant species comprising a composite fauna of the Indo-chinese, Malayan, Palaearctic origin together with the species of the Indian Peninsula made the area very rich and diversified. Of the total of one hundred and thirtyfive Genera of terrestrial mammals of the Indian Region, some eightyfive are found in Northeast India.

Wildlife in Assam and the neighbouring hilly states is under considerable pressure at present due to human interference. As a result of increasing human population by leaps and bounds and exodus from the neighbouring countries in recent years, the demand for more land for settlement, cultivation for subsistence for the hungry millions, pastureland for their cattle, more timber for house-building, furniture, firewood, etc., and area for factory complex, have exerted extra pressure on the land. Such abrupt changes in the ecology of the nature has been replaced by human ecology. During the last 50 years encroachment of forested land has brought about shrinkage of wildlife habitats. Wildlife animals that once abounded in the alluvial riverine plains, beels, wetland, forested areas over mountain slopes and valleys, around tea-estates and jhoomland, has been appreciably decreased in numbers and some species have disappeared. Man has indulged too much with nature, the changing ecology is so much warranting that at this pace of deterioration of the status of the endemic species, if allowed to continue, the record of animal made in the early part of this century will only remain with us and not the animal. A few such affected species of mammals which today are standing at the fencing are ennumerated in the following chapters.

THE PIG-TAILED MACAQUE

Macaca nemestrina(Linnaeus)

Macaca nemestrina leonina Blyth

1863: *Macaca leoninus* Blyth, *Cat. Mamm. mus. As. Soc.*, **7**, Northern Arakan, Burma.

Local names : Burmese : *Myouk-mai; Myouk-padi;* Naga : *Kangh.*

Distinguishing characters: Similar to the Rhesus Macaque but stouter; limbs long, powerful, muzzle long; hair on the forehead and crown darker and short radiating from a centre whorl; face bare light brown; coat colour variable from dark brown to black, underside greyish-white, lower abdomen light red, hind quarters pink brown; tail dark reddish brown carried erect and arched in the manner of the pig; during oestrus the female develops swelling and reddening of the genital parts and buttocks and the testicles in males attain fleshy colour.

Size and weight: Head & body length 432-595 mm; tail 135-245 mm; Weight: Male, 6.2-14.5 Kg; Female, 4.5-10.9 Kg.

Distribution: Northeast India and Southeast Asia extending to Malayasia and Indonesia.

Four subspecies are recognizable of which *blythii* (?) and *leonina* are represented in the Indian subcontinent.

Habits, habitats, etc. : Affects tropical wet evergreen forests at an altitudinal range between *c.* 75-1300m.

Status: Rare. It has recently been recorded from Khasi Hills (Biswas and Diongdoh 1978)[1], and from Sibsagar district, Assam (Tilson 1980)[2].

STUMP-TAILED MACAQUE

Macaca arctoides Geoffroy

1831: *Macacus arctoides* I. Geoffroy, *Zool. Voy. de Belanger*, **61**, Cochin, China.

Local names : Assamese : *Maw ka;* Naga : *Chantee*

Distinguishing characters: Similar to the Rhesus Macaque but with a tail strikingly short; upper coat colour dark chestnut, underparts pale; face pink to bright red and blotched; forehead bald, hair on the crown short, radiating from the centre of the crown; head, shoulder, back and sides bare shaggy hair; buttocks reddish, area around callosites bright red.

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[1] Biswas, S. and Diongdoh, H. 1978. Notes on Stumptailed Macaque (*Macacu speciosa* F. Cuvier) and Pig-tailed Macaque (*Macaca namestrina* Linn.) from Meghalaya, *J. Bombay Nat. Hist. Soc.*, **74** : 344-345.

[2] Tilson, R. L. 1980. Behaviour of Hoolock Gibbon (*Hylobates hoolock* during different seasons in Assam, India, *J. Bombay Nat. Hist. Soc.*, **76** : 1-16.

Size: Almost that of the Rhesus or Assamese Macaque; head and body length 500-700 mm; height 600 mm; weight 6-18 Kg; male larger than female.

Distribution: South and Southeast Asia, in the Indian region found in eastern India in Assam, South of the R. Brahmaputra.

Habits, habitat, etc. : A denizen of the hill-forest, also affects marginal groves and gardens near human habitation; largely arboreal but occasionally descends to forest floor for foraging; quite fearless and aggresive when provoked; less agile; troupe of a dozen or two comprising adults of both sexes and members of all ages are lead by a superior male who establishes leadership over others by challange of strength thrown to other males of the troupe or of different groups; food comprises fruits, leaves, tender shoots, roots, seeds of both wild and cultivated plants; the group leader maintains a harem of a six to a dozen female members; breeding period ill-defined, generally spring and summer are the periods when mating takes place; gestation period is the same as in the Rhesus (160-170 days); generally one infant is born; communication among the members is highly developed—different notes, denote, signals, warnings, guidance, mating calls, etc.

Status: Rare in Assam, uncommon all over its range (Southwick & Siddiqui 1970)[1]. Hunted throughout Southeast Asia, its flesh is eaten by some Naga tribes.

THE GOLDEN LANGUR

Presbytis geei Khajuria

1956: *Presbytis geei* Khajuria, *Ann. Mag. Nat. Hist.*, (12), **9**: 86-88

Local namee: Assamese: *Honali Hanuman*; Bhutanese: *Propyaka, Sugrib*.

Almost like the Nilgiri Langur but with a deep cream to light golden coat instead of black; face black, hairless; a ruff of hair radiates from cheeks and temples and a half whorl on fore-head; underparts pale; tail longer than the head and body, terminating with a slight tassel.

Size: Length *c.* 125 cm (male); head and body 64-72 cm; tail 78-94 cm; weight 10-12 kg; female smaller.

Distribution: Southcentral Bhutan and Assam between the river Sankosh in the West and Manas in the East.

Habits, habitat, etc. : An inhabitant of the tropical decidous mixed forests spread over the hilly tracts of Bhutan foothills; smaller and large troupes of a dozen to half a dozen members are generally met with. Troupes move about throughout the day but are more active in early mornings and late evenings, feeding on leaves, buds, fruits and drinking from rivers and streams; members are generally non-aggresive and shy, when suspicious males give alarm calls 'hoop-hoop-hoop' and the troupe moves to a protective shelter and even swim across river and stream readily if required; breeding commences in winter, young are born in September-October after a gestation period of nine months.

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[1] Southwick, C. H. and Siddiqi, F. M. 1970. Primate population trends in Asia, with specific reference to the rhesus monkeys of India. Papers and proceedings of the 11th Technical meetings of the International Union for the conservation of Nature (New Delhi, November 1969), **1**: 135-147.

Status: Since the Langur is confined to a small restricted area which is being modified for land use, the population has been concentrated in the central Bhutan and in other areas it is thinning out. A fair estimation of population is about 2000 animals in the whole range of its distribution. Saha (1980)[1] found 67 troupes comprising 1000 langurs. The author had made an estimation of its number in Manas Bhutan in 1977 and is of opinion that more than 500 langurs are restricted to the sanctuary and there were some two dozen troupe. The population is fairly good at present but as some areas of forests are being disturbed for commercial utilization of timber, there remains a threat to the survival of the species confined to the special habitat.

THE HOOLOCK GIBBON

Hylobates hoolock hoolock (Harlan)

1834: *Simia hoolock* (Harlan), *Trans Amer. Phil. Soc.*, **4**: 52, pl. 2, Garo Hills, Assam.

Local names: Assamese: *Ooluk*; Bengali: *Uluuk*; Arakanese: *Tooboung, Myouk umaigyau.*

Distinguishing characters: The Hoolock Gibbon is the smallest of all apes known in the world. The adult male is black and female brownish grey to buff. It is slender built, head small and round. The silvery white band above the eye-brows are conspicuous. Nostrils are widely spaced and almost flat. Its greatly developed arms which are more than double the length of its legs and absence of its tail distinguish it from tailed primates.

Size: Total height 94 cm; head and body length 45-63 cm; weight 6·1-7·9 kg.

Distribution: The Hoolock is the only ape found in India. Its range extends from eastern India through northeastern India and Bangladesh to northern Burma and western Yunnan (China). The species has several races of which the nominate race is represented within the Indian limits.

Habits, habitats, etc. : Affects forested areas preferring wet evergreen hilly forests and adjoining plains; entirely arboreal but when it descends to the forest floor it stands upright; movement is by swinging through the trees, arm over arm, with grace and incredible speed clearing about ten metres leaping from one branch to another limited within its own territory; family groups comprise three to six members; its mild disposition and shy nature makes difficult to locate it specially when it retires among shady foliage unless it communicates. Voice and call are powerful which are produced by large throat pouches which act as resonators; calls are repeated 'whoko, whoko, whoko......'. Its activities are more in the early morning and late evening resting during the day in shady cover in lower branches; at night it sleeps in sitting posture burying its head between the knees; food comprises, fruits, leaves, shoots, arthropods specially spiders, bird's eggs, small mammals, mostly rodents; breeding maturity is at six to seven years (Mathews 1946)[2] the consorts being monogamous are attached to each other for several years; mating takes place during early rains and a single young is born in winter (Mc Cann 1933)[3].

Status: Endangered; habitat destruction as well as large scale killing by tribals are affecting the population alarmingly. The approximate number of apes estimated in 1971-72 is about 78,700 in eastern India (Tilson 1980), but this figure is questionable. In view of recent observation (1979-80) by the author, there should not be more than 5,000 within the Indian limits.

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[1] Saha, S. (1980). The Golden Langur, *Presbytis geei* Khajuria in Bhutan. *J. Bombay Nat. Hist. Soc.*, **78**: 493-495.

[2] Matthews, L. H. 1946. Notes on the genital anatomy and physiology of the gibbon (*Hylobates*). *Proc. Zool. Soc.*, London, **116**: 339-364.

[3] Mc Cann, C. 1933. Notes on the colouration and habits of the white-browed gibbon or hoolock (*Hylobates hoolock* Harl.), *J. Bombay Nat. Hist. Soc.*, **36**: 395-405.

RED PANDA

Ailurus fulgens F. Cuvier

1825: *Ailurus fulgens* Cuvier in Geoffroy & Cuvier, *H.N. Mamm.*, **3** (50): Panda, Locality unknown ("East Indies")

Local names: Bhutanese: *Wah-donka, Woker*; Lepcha: *Saknam;* Nepali: *Wah, Ye, Nigalyaponya.*

Distinguishing characters: The Red Panda is considered a lesser carnivore. It has neither the true characteristic of a cat nor of a bear but a combination of both. The general tone of its wooly coat has a fantastic colour pattern, bright chestnut red, bushy tail with rings of light and dark shades of brown terminating in a black tip; edges of ears are white, face is buffy white with black markings; underside of the body and legs are black.

The Panda is distinguishable from the bear by special characters associated with the genital organs and in possessing a glandular sac surrounding the anus. Its plantigrade feet armed with retractile claws and pigeon-toed forelegs are completely covered with a dense mat of wool.

Size: Total head and body length is 110 cm, height at shoulder is in average 30 cm; weight 5-6 kg.

Distribution: The nominate race *Ailurus f. fulgens* is confined between 2,000-4,000 m from Nepal to Arunachal, the Chinese race, *Ailurus f. styani* extends from northern Burma to Yunnan and Szechuan.

Habits: Generally arboreal, occupies hollows of trees or branch forks, rock crevices, sleeps perched on trees during the day; activities resumed at night and also in early hours of the day and late hours in the evening, descending from trees to the forest floor to feed upon vegetable matters comprising dropped fruits, lichens, roots and tender leaves, readily climbing bamboos to take tender leaves and shoots, invades birds nest to appropriate eggs and chicks of birds.

Breeding: The breeding seasons are spring and autumn. During courtship the pair emits high pitched nuptial concert; litter size is restricted to a pair, hollows of trees or crevices are preferred for rearing the young ones.

Status and economy: The Red Panda was found throughout the subtropical-temperate region from West to East Himalaya but at present it inhabits a few undisturbed areas in Darjeeling, Sikkim, and Arunachal within the Indian limits. Since this beautiful chestnut furred cat is attractive and also for its friendly disposition it has been sought for export in large numbers for zoos and private menagerie. As a result there is a serious declination in its population. It is now having legal protection in its habitat and export of the animal has been banned. Its breeding in captivity has been approached which may help to increase its number for future export promotion.

THE GOLDEN CAT

Felis temmincki temmincki (Vigors and Horsfield)

1827: *Felis temminckii* Vigors and Horsfield, *Zool. J.*, **3**: 451, Sumatra.

Local names: Assamese: *Honalibagh;* Bengali: *Sonali Bagh:* Burmese: *Kyamin.*

Distinguishing characters: The Golden Cat as its name indicates has a golden brown pelage without markings varying to reddish brown or grey, head marked with white, black, and grey stripes, sometimes curved stripes run from above eyes to the ears, underside paler with black markings, tail long almost half the body length.

Size: Smaller than the Hunting Leopard, total length *c.* 1200 mm; head and body 750 mm; tail 450 mm.

Distribution: Montane and submontane regions of Nepal, east to northeastern India and through Burma to western China, south to Sumatra. Three subspecies are recognizable, the nominate subspecies is represented within the Indian limits.

Habits, habitats, etc.: An inhabitant of the tropical deciduous and wet dense forests along the southern slopes of the Himalayas. It lives among rocks and preys upon smaller wild animals as well as livestock; it being an expert climber, appropriates roosting birds on trees at night and uses natural hollows for giving birth to youngs which are generally two in number. The kittens are kept safe in such hollows from ground predators and also from birds of prey, the only menace is the male cat of its own kind that limits its population.

Status: Threatened, population throughout its range of distribution is fast depleting due to shrinkage of primary forest areas in recent years and also regular trade in live animals.

THE MARBLED CAT

Felis marmorata Martin

Felis marmorata charltoni Gray

1846 : *Felis charltoni* Gray. *Ann. Mag. N. H.*, **18:** 211, Darjeeling, North India.

Local names: Bengali: *Chite-biral;* Hindi: *Chitkabar-biral.*

Distinguishing characters: Similar to the Leopard Cat (*Felis bengalensis*) but with a shorter, broader and more rounded head, the colour and pattern much resembles the Clouded Leopard (*Neofelis nebulosa*); colour and pattern of the coat rich ochreous-brown with stripes on the crown, neck and back and blotches on sides and flanks, spots on the limbs and tail conspicuous; tail long almost half of its total length.

Size: More or less that of the Jungle Cat (*Felis chaus*) length *c.* 900 mm; head and body 450 mm; tail 450 mm.

Distribution: Ranges from Nepal to northeastern India along the forest foothills of the Himalaya and through Burma to Malaysia; the species is represented by the race *charltoni* within the Indian subcontinent.

Habits, habitats, etc.: An inhabitant of the tropical forests; arboreal, nocturnal, preys largely on birds, chicks, rats, squirrels, retires in day time in some hollows of trees, information on breeding is scanty, kitten are nurtured by the mother cat in hollows.

Status: Rare.

THE INDIAN TIGER

Panthera tigris tigris (Linnaeus)

1766: *Felis tigris* Linnaeus, *Syst. Nat.*, (10th ed.) **1:** 41, Egypt.

Local names: Assamese: *Bagh;* Bengali: *Bagh;* Hindi: *Sher;* Marathi: *Nahar, Sela Bagh;* Oriya: *Bagh;* Telegu and Tamil: *Pulee.*

Distinguishing characters: The Indian Tiger is the most impressive, majestic and biggest of the cats. It's characteristic yellow to orange-rufous coat marked with black stripes and white below, a long gradually tapering black-ringed tail, black ears with prominent white spot and a ruff in adult male are distinctive features.

Size: Male total length 300 cm; weight 240 kg.

Distribution: The species is confined to the Asian continent only. The Indian subspecies (*tigris*) is found practically throughout India, except the arid region of the northwest India.

Habits, habitats, etc.: One of the most adaptable animals that occupies variety of habitats from snow-line of the Himalaya to the tropical forests, mangrove swamps and marshes, and semi-desert area. It is a clever hunter, stalking its prey very intelligently taking help of bushy cover for tactical attack. It feeds mainly on herbivorous animals, wild boar, langurs and monkeys. In tidal forests it feeds on fishes, prawns crabs, water monitor and wading birds. Cattle-lifting in the forest periphry is known in every part of the country. Man-eaters crop up from time to time as a result of manhandling the animal specially when it is incapacitated making them incapable of hunting its natural prey. The population of the Sundarban tiger has acquired the habit of man-hunting which is not known in any other part of India. The Tiger is a solitary hunter and each has a foraging territory. A kill of a tiger is often shared by tigresses and cubs.

Sexual maturity is attained by the tiger when it is about four years old. Males fight among themselves and the tigress is courted for about a week prior to mating. Gestation period is about 15 weeks, three or four cubs are generally born.

Status: It is estimated that half a century ago, there were about 40,000 tigers in India (Gee, 1964).[1] In South India by 1965 it was completely wiped out by poachers. A comprehensive census in 1972 of the Indian Tiger showed evidence of 1827 tigers in India, 20 in Bangladesh and 200 in Nepal. In the recent report of 1979 its population in India has been estimated to be 2484 only. Under the "Project Tiger" launched by the Government of India with the collaboration of the World Wildlife Survival Commission, the tiger population has increased to 3015 by 1979 in eleven declared sanctuaries under "Project Tiger". Such sanctuaries are Sundarban (West Bengal), Corbett (Uttar Pradesh), Kanha (Madhya Pradesh), Manas and Simlipal (Orissa), Melghat (Maharashtra), Bandipur (Karnataka), Palamau (Bihar), Periar (Tamil Nadu), Ranathambore and Sariska (Rajasthan). Besides these four new project tiger sanctuaries proposed in 1983 are the Nagarjunsagar (Andhra Pradesh), Namdhapa in Arunachal, Indravati (Madhya Pradesh) and Buxa In West Bengal. It is expected that by the end of 1984 the tiger population will be no less than 3500.

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[1] Gee, E. P. 1964. *Wild. Life in India,* London.

THE SNOW LEOPARD

Panthera uncia (Schreber)

1776: *Felis uncia* Schreber, *Saugeth*, **3**: pl. 100 (1776) & text p. 386, 586 (1777).

Local names: Kumaon: *Burhel haye, Burhal;* Garhwali: *Burhel he;* Bhotia: *Zig, Ikar, Sachak;* Lepcha: *Pahle.*

Distinguishing characters: From the Indian Panther the Snow Leopard differs in having a short face and head, longish thick fur and comparatively longer bushy tail and also smaller in size. The colour of the coat is whitish creamy to grey buff above and pure white below. The squarish head and shoulder have solid black spots and rosettes on the body. Its short muzzle, high forehead and the black ears with conspicuous yellow spot identifies it from other members of the cat family.

Size: The total length varies from 190-230 cm; tail 90 cm.

Distribution: The Snow Leopard is found throughout the Himalayan and other connecting mountainous ranges of the Pamir extending to Central Asia, Altai, southern Siberia, Tien Shan, Tibet, and capping the Indian subcontinent in the north from Hindukush in the west to Arunachal[1] in the East.

Habits, habitats, etc.: The Snow Leopard is an inhabitant of the snow covered rocky mountains between 2000-4000 metres, its movement is guided by climatic variations. It is nocturnal, from dusk to dawn; it hunts wild sheep, goats, musk deer, rodents, rabbits, marmots and often preys on domestic livestock.

Status: About a hundred years ago the Snow Leopard was reported to be common throughout its range of distribution but due to demand of its attractive pelt, it has been excessively hunted to support home industry of fur coat, hand bags, gloves, cushion covers, etc. As a result of such commercial exploitation its number has seriously been reduced. In 1952, the Indian Board for Wild Life (Protection) placed this animal on the protection list and under the Wild Life (Protection) Act of 1972 of Government of India it has been completely protected and the trade on its fur and skin have completely been banned by the International Fur Trade Federation in 1971. In the Dachigam, Kishtwar and Hemis High Altitudinal National Park in the state of Jammu and Kashmir this elegant cat is being protected.

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[1] The author learnt from reliable sources of its occurrence in Tawang and Miri Hills in the western parts of Arunachal in 1979-80.

THE GREAT ONE HORNED RHINOCEROS

Rhinoceros unicornis Linnaeus

1758: *Rhinoceros unicornis* Linnaeus, *Syst. Nat.*, (10th ed) i. p. 56. Probably the Sub-Himalayan Terai of Assam (Lydekkar).

Local names: Assamese : *Gor;* Bengali : *Gondar;* Hindi : *Gainda;* Nepali : *Genda.*

Distinguishing characters: The One-horned Rhinoceros is a huge, ungainly creature, with a thick blackish-grey skin which is folded into characteristic shields and folds; on sides it is studded with convex tubercles. It possesses a horn on the snout which is fairly developed in adults. The skin is practically hairless except on tail and ears. This species is one of the largest living Rhinoceros.

Size: Length from nose tip to tail tip, about 3·9 metres; height 1·5 to 1·8 metres; weight: 1647 kg; length of medium horn (along curve) 60 cm.

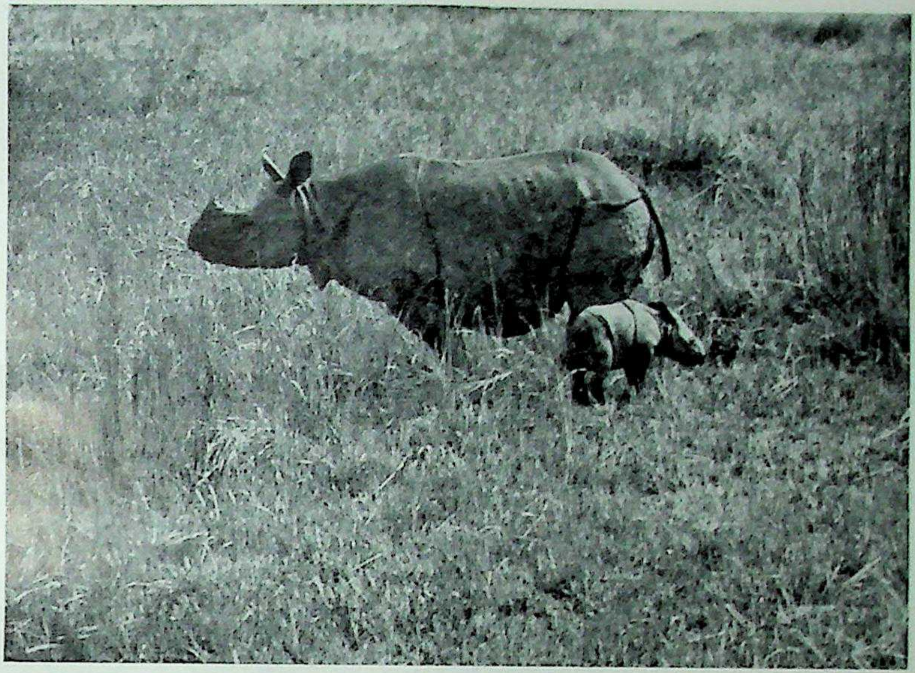
Distribution: The Rhinoceros is confined at present to the eastern Tarai in East Nepal, West Bengal and Assam. The population is scatterly distributed in the Chitwan-Rapti Valley, Jalpaiguri, Cooch-Bihar, Brahmaputra valley in Assam (North Kamrup, Nowgaon, Sibsagar and Darrang districts).

Habits, habitat, etc.: Generally solitary, sometimes found grazing in groups. It affects swamp and grass-lands but is also found in thin jungles along low hills. It is a grazer as well a browzer, chief fodder are tall elephant grass, viz., *Saccharum* spp., *Arundo donax*, *Phragmites* sp., *Andropogon* sp. and other aquatic vegetation as well as tender leaves of shrubs and trees. Vision is poor but senses of hearing and smell are well developed. Excreta is dropped at a special place where as a consequence, dung-heaps accumulate indicating "Rhino Route" in the forest and such dung-heap is used by all rhinos passing that way. The animal is normally non-aggresive except when it is in heat or the female is with the calf; the wild buffalo and deer share the same foraging ground. The tiger is the only natural enemy of the rhino calf but the predator avoids adult rhinos; when it is excited it produces a peculiar grunt and while courting both the sexes whistle. It breeds all the year round, gestation period is 18-19 months and one calf is born. Most of the new births take place in October. It is fond of wallowing and each animal has a fixed place of wallowing.

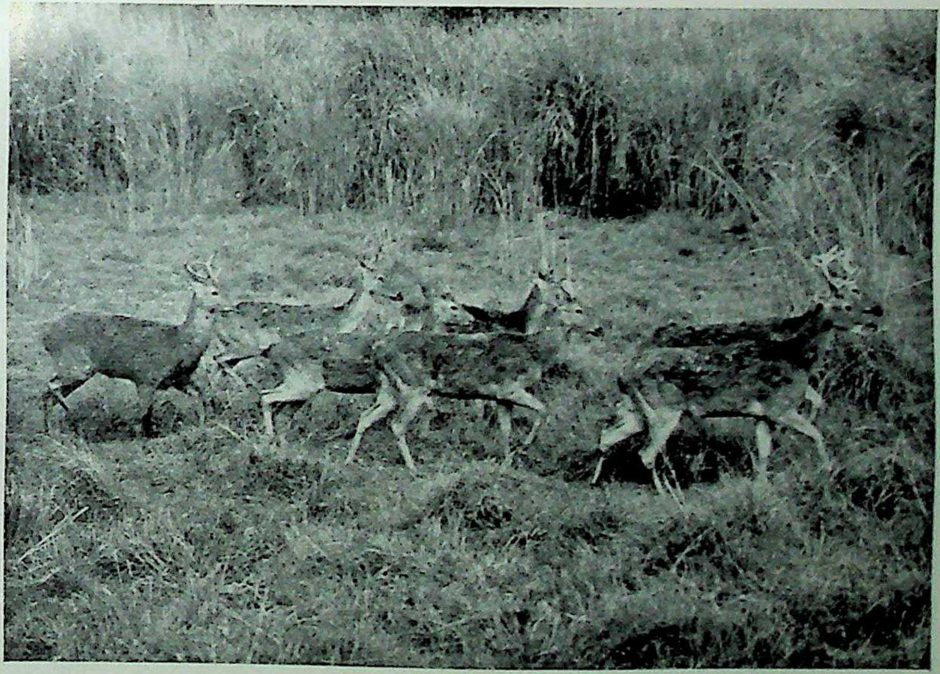
Status and economics: In 1906 it was near extinct but rigid protection has helped to raise its number to 1600-1650 by 1980, lodged in rhino sanctuaries in Nepal, West Bengal and Assam. In the Kaziranga National Park which is known as the "Rhinoland" there are more than 900 animals at present (1982). There are immense possibilities of increasing its population by re-establishing the animal in other areas of Nepal and northern parts of the Tarai where once this animal existed and a few suitable areas proposed are Dudua National Park, Nichlaul forest in Uttar Pradesh.

The reason for its depletion is its commercial exploitation. Its horn is highly prized because of its supposed aphrodisiac properties. A cup made of horn is believed to be a poison detector as well as it renders poison innocuous; it is also believed to help in child birth when it is placed under the bed and telisman made out of the horn protects the wearer from all evils and danger. Hide, hair, hooves, tail and bones are used as charms and medicine and urine as cure for gout and rheumatism.

PLATE I

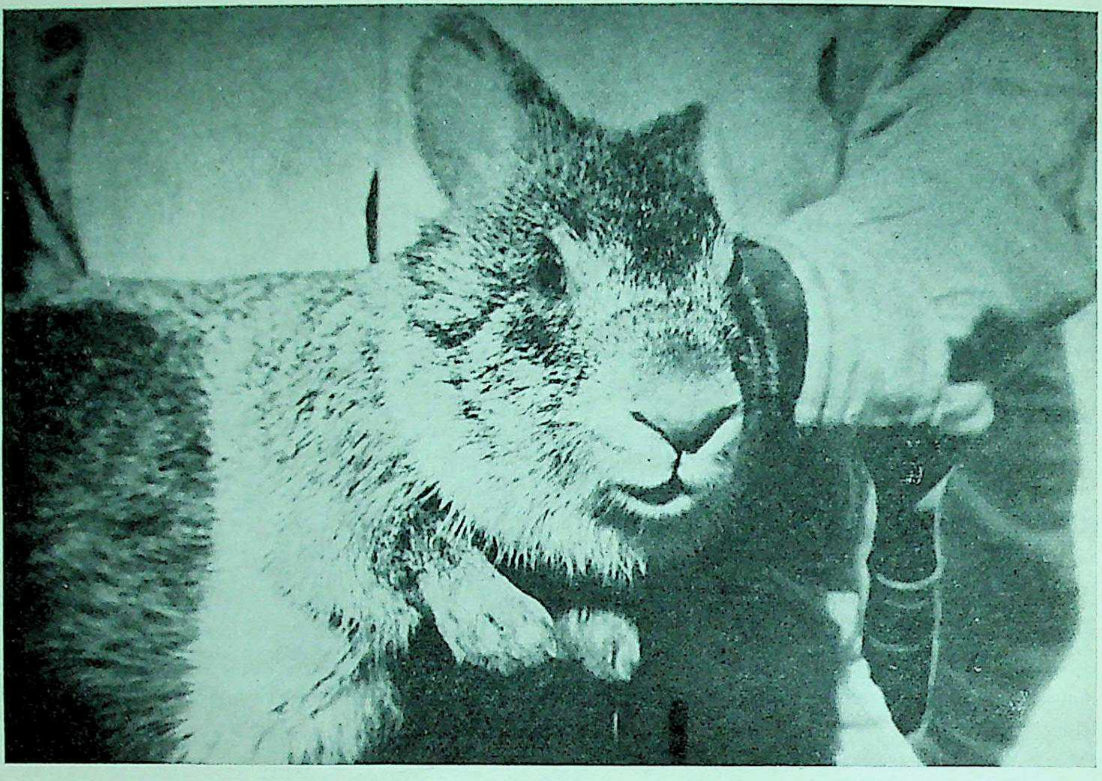


Indian great one-horned Rhinoceros



Swamp deer on run

PLATE 2



The Hispid Hare

The Pigmy Hog

THE TIBETAN WILD ASS

Asinus kiang (Moorcroft)

1841: *Equus kiang* Moorcroft, *Travels in the Himalayas Provinces*, **1:** 312. Eastern parts of Ladakh, Kashmir.

Local names: None recorded.

Distingushing characters: More or less like the preceeding wild ass but darker and redder, and has a narrower dorsal stripe and larger horse like hooves.

Size: Slightly larger than the preceding race.

Distribution: Occurs in the Tibetan plateaux. In the Indian Region in Ladhak and Sikkim.

Habits, habitats, etc.: A denigen of high plateaux and snow covered regions; depends largely on summer grass, shrubby vegetation; moves about a lot in search of fodder.

Status: Endangered; a few herds of a dozen or two roam about in Ladakh and the northern plateaux of Sikkim.

THE PIGMY HOG

Sun salvanius Hodgson

1847: *Sus salvanius* Hodgson, *J. Asiat. Soc. Bengal*, **16:** 423, Calcutta, Sikkim Terai.

Local names: Assamese: *Nal-gahori;* Bengali: *Khude-Suwor;* Hindi: *Chhota-Suvar;* Nepali: *Sano-banel.*

Distinguishing characters: A diminutive form of the wild boar; adult blackish brown and young almost entirely lacks longitudinal markings; upper tusk short, snout shorter than the larger wild boar; ears and tail short; coat coarse and scanty; teats in three pairs instead of four as in the Indian Wild Boar; fourth toe present; teeth 40.

Size: Smallest pig known in the world; length *c.* 700 mm; height at shoulder 230 mm; tail 30 mm ; male weighs 3·5-4·5 kg, female smaller and lighter.

Distribution: Formerly distributed throughout the Himalayan foothills hills in the grassy plains from western Uttar Pradesh to northwestern Assam; presently confined to the forest belt of northeastern Assam, reported also from Garo Hills, northern Bangladesh and southeastern Assam.

Habits, habitats, etc.: Affects highland flat grassy belt along the Tarai and Duars; ideal habitat are the dense tall grass and scrub savannah of the upland well drained by rivers and rivulets; adult boars are usually solitary except during rut, sow with young is socially cohesive, small herds of 5-20 individuals are usually met with; active during dusk and dawn, essentially diurnal; very agile, on least suspicion runs fast to hide in thick grass; omnivorous, food comprises roots and tubers, occasionally insects and small animal matter; reported to have a single breeding season in April and May, produces a soft grunt to maintain group cohesion; both sow and adult boar make nests in thick thatch, generally 2-6 young are born.

Status: Seriously endangered. The population which are at present discontinuously distributed in small areas in forest reserves are highly vulnerable due to tremendous exploitation pressure. Manas sanctuary is the only habitat where small population of this species exists (Oliver 1980)[1]. The population may not exceed 200 individual today.

HIMALAYAN MUSK DEER

Moschus moschiferus Linnaeus

1758. *Moschus moschiferus* Linnaeus, *Syst. Nat.* 10 ed. **1:** p. 66 "Tartary approaching China".

Local names: Bengali: *Kasturi-mriga;* Hindi: *Mushk, Kastura;* Kashmiri: *Raos, Rons;* Nepalese: *Masak naba;* Tibetan: *La Lawa.*

Distinguishing characters: The Musk Deer is of primitive origin combining some characters of antelope and deer, its head is small, face pointed with long ears, arched back, both the sexes are hornless and have no facial glands, a globular musk gland (pod) is present beneath the skin of the abdomen of the male and a caudal gland present. Male has well developed large canine teeth which extend far below the upper lip in adult which of moveable in sockets and can be manipulated forward and backward. The coat consists of coarse thick and bristly hair. General coat colouration variable having a shade of sepia-brown to golden-red speckled with grey, paler beneath the chin, inner borders of the ears and insides of the legs are whitish, a spot of white on each side of throat is present. It possesses a gall-bladder, which no deer possesses, its tail is peculiar which is competely buried in the long hairs of the anal region and is more or less naked except the tip that is tufted. A single pair of teats is found in female instead of two in other deer. Other glands found a deer such as tarsal, metatarsal, suborbital are absent in this deer.

Size: A small deer of about 50-60 cm high at shoulder, canine, 7-10 cm in length and weights 9·0-11·0 kg.

Distribution: The Himalayan Musk Deer is extensively distributed from west Himalaya to north-eastern Himalaya extending to northern Burma and parts of Tibet and southwest China. Ellerman and Morrison-Scott (1951)[2] have recognized a single species of musk deer, *Moschus moschiferus* in the Himalaya region. Groves (1975)[3] however recognized two species, viz., *Moschus chrysogaster* Hodgson and *Moschus, sifanicus* Buchner, the former occupies the alpine zone and the latter, the coniferous cone. The taxonomy being controversial, the Himalayan musk deer is at present treated as *Moschus moschiferus moschiferus* Linnaeus.

Habitat: The musk deer inhabits dry temperate and alpine forests (*c.* 2500-3810 m) in different ecological successions. It is chiefly nocturnal, unsocial, shy, found singly or in pairs, concealing itself in a self scraped out shallow, feeding during dusk and dawn. Its diet consists of a variety of vegetation such as grass, moss, lichen, leaves and tender shoots. The deer is normally silent, when alarmed produces a hissing sound and screams on being wounded. It is said to have on apparent love for music.

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[1] Oliver, W. L. R. 1980. The biology and conservation of the Pigmy Hog. *Sun (Porcula) salvanius* and Hispid Hare *Caprolagus hispidus.* The Jersey Wildlife Preservation Trust, Special Scientfic Report No. 1, p.46.

[2] Ellerman, J.R. and Morrison-Scott, T.C.S. 1951. Check-list of Palaearctic and Indian Mammals, London.

[3] Groves, C.P. 1975. The taxonomy of *Moschus* (Mammalia, Artiodactyla with particular reference to the Indian region. *J. Bombay Nat. Hist. Soc.,* **72:** 662-676.

Breeding: Rutting takes place during winter between November-January, when small mixed groups of three to seven animals may be observed. Females attain sexual maturity within 16-17 months and remain in oestrus for about a month. Males are matured after two and a half years or so, which is indicated by the discharge of musk the aroma of which helps to attract the female. Gestation period is about six months. A single fawn is usually born between April and the end of June.

Economy and status: Musk, a gelatinous, brown secretion secreted by the preputial gland 'musk gland' or 'pod', has been in use in medicines and cosmetic since time immemorial. This secretion known as Muskon is an organic ketone that occurs in small percentage. The pod may weigh up to 40 g. and musk grain obtained may weigh 6 to 8 g. from a fully grown male during the season. As it is one of the best known natural fixatives for perfume, it is highly priced fetching U.S. $ 40,000-50,000 per kg on the international market. As many as 100 indigenous medicines are prepared from musk. The musk is known by different countries by different names such as *Tonquin* in Nepal, Assam and Yunnan, *Carbardine* in Russia and China. As many as 100 indigenous medicines are prepared from musk. Besides the musk production, its hides is sold for its excellent buck skin. Due to handsome return for the musk there is an increasing demand of the commodity as such ruthless persecution of the deer during the last 50 years has thinned out its population throughout its distribution range. Lydekker in 1898, stated that the species had become scarce in North Kashmir valleys. Owing to rigid protection extended to the Wildlife in the State by the rulers of Kashmir, the deer has survived in Kashmir (Ward 1925)[1]. Street (1961)[2] remarked "The musk hunters persue the deer with such determination and skill that the annual toll approaches 100,000. How much longer the species can stand this enormous drain on its number we do not know". The animal has also lost much of its habitat due to its habitat destruction in subalpine forest zone.

The deer has now been protected under the Indian Wildlife Act since 1972 prohibiting trade in musk not only in India but also at an international level. In spite of such legal protection, illegal trade goes on in remote areas. Except for some sanctuaries and national parks in the Himalayan ranges in Jammu and Kashmir, Himachal Pradesh, Uttar Pradesh and Sikkim where it is being legally protected, the deer is scarce.

In recent years it has been discovered that musk can be extracted either by surgical operation of the gland or by inserting a tube into the aperture when a stream is excreted by slight pressure on the gland. These operations however save the animal from being killed for the purpose. The musk is also being replaced by a synthetic product which has almost the same aroma. It is expected that the pressure on this endangered deer will gradually decline which may help its survival.

THE SWAMP DEER

Cervus duvauceli G. Cuvier

1823: *Cervus duvauceli* G. Cuvier. *Oss. Foss.* ed 2, **4**: 505.

Local names: Assamese: *Dol karina;* Bengali: *Barosnghe;* Hindi: *Gond, Barasingha;* Marhatti: *Gonjak Gaoni;* Nepalese: *Barya Ghosh.*

Distinguishing characters: Little smaller than the Indian Sambar (*Cervus unicolor*). Basic colour brown, underparts yellowish brown, doe lighter than the stag; hair fine, more or less wooly; stags bear mane, underside of the tail white or cream yellow; during summer both sexes develop watery marks with inconspicuous spots, fawns white-spotted; antlers fine and large with much variation in form; number of points on horns vary from 10-20.

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[1] Ward, A.E. 1925. The mammals and birds of Kashmir and adjacent Hill Provinces. *J. Bombay Nat. Hist. Soc.*, **30**: 253-259.
[2] Street, P. 1961. Vanishing Animals. London.

Size: Stag stands about 135 cm high at shoulder, good-sized antlers measure 90 cm and above up to 100 cm round the curve; weight 170-200 kg (adult male).

Distribution: Exclusively confined within the Indian limits and is represented by two races, the northern race (*Cervus duvauceli duvauceli* G. Cuvier) and southern race (*Cervus duvauceli branderi* Pocock), the former is found in swampy areas along the foothill tracts of Uttar Pradesh from Jamuna river in the west through southwestern Nepal to the Brahamaputra valley in the east, the latter is confined to Madhya Pradesh forested plains. The hooves of the northern race is splayed out to give a support in soft ground whereas the southern race has well knit hooves to gallop on hard ground, and is also smaller, darker and have a rough texture of antlers.

Habits: A dweller of the deciduous and wet evergreen swamp lands along the riverine belt (northern race) and hardground grassy plains within the deciduous forests (southern race). The deer are highly gregarious 10-15 individuals of one sex are usually noticed to move about separately. In herd they have a definite territory and do not generally move out of their area unless repeatedly disturbed. They prefer tall grasslands comprising *Saccharum* sp., *Vitiveria* sp., *Erianthus* sp. *Themeda* sp., *Phragmites kakra*, etc., which serve as cover as well as fodder. Fresh grass growing after forest fire attracts them. Besides grass, leaves and fruits of herbs and shrubs are also included in their diet. The deer in Madhya Pradesh are dependent on meadow grass as well as leaves of *Acacia* and other thorny plants.

Breeding: In northern India breeding period of the deer is in November-December and in eastern India, April-May and in central India it is from December to early February. During rut stags bray frequently in the manner of a donkey, stags challanging each other, fighting over the sexual right to acquire the harem. When the rut is over master stags desert the hinds and join each other forgetting the old rivalry and form a sizable herd, similarly hinds also form a separate herd. Young are born after a gestation period of six months.

Status: At present endangered. It was quite common more or less in the sal (*Shorea robusta*) forested areas and mixed forests throughout the reverine plains of Indus, Ganga, and Brahamaputra in upper India and also in the central Indian plateau as far south as Godavari river (Brander 1923, pp. 193-94).[1] It was also reported from Indus swamps till the end of the 19th century (Finn 1929).[2] At the advent of the present century the population diminished throughout its range and was almost wiped out from the western part of India (Burton 1952: 860-61).[3] In Bengal it was present in Jaldapara sanctuary till 1961 and from certain parts of Sundarban forests it was reported till the end of the 19th century (Mountfort 1969).[4] The reasons for the depletion of its population are release of forest land to agriculturists and rehabilitation for the growing human population in wilderness, replacing wildlife by human-life. The deer is now localised in some pockets in the forest divisions of Pilibhit, north and south Kheri, Bahraich (Martin 1977),[5] Sukla-Phanta (southwestern Nepal), Kaziranga in Assam and Kanha National Park in Mandla district, Madhya Pradesh. There are some 4000 swamp deer left in the wild in the World today the highest number of the northern race is congregated in Dudhwa National Park (2100 heads in 1980).

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[1] Brander, A. A. Dunbar 1923. *Wild animals in Central India* pp. XV+296, London.
[2] Finn, F. 1929. *Sterndale's Mammalia of India*, Calcutta.
[3] Burton, R. 1952. A history of shikar in India. *J. Bombay Nat. Hist Soc.*, **50**(4): 845-869.
[4] Mountfort, G. 1969. *The Vanishig Jungle*, London.
[5] Martin, C. 1977. Status and ecology of the Barasingha (*Cervus duvauceli branderi*) in Kanha National Park (India). *J. Bombay Not. Hist. Soc.*, **74**(1): 60-132.

The single population of the southern race comprising 283 heads counted in 1977 exists only in the meadows of the Kanha reserve, which has now further increased to 350 spreading out over many locations in the 940 square kilometres of the National Park.

THE BROWANTLERED OR MANIPUR DANCING DEER

Cervus eldi eldi M'Clelland

1842: *Cervus eldi* M'Clelland, *Calcutta J. Nat. Hist.*, Calcutta, **2 :** p. 417.
"The valley of Munipore" E. India.

Local names: Burmese: *Thameng*; Manipuri: *Sangai, Shangai.*

Distinguishing characters: The Browantlered Deer can readily be distinguished from other deer in having a distinctive bow-shaped antler, like a prostrate letter "C". Its coat is coarse and sparse. Stags develop a mane and are dark brown whereas the hind are maneless and light fawn, and the young are spotted. It has developed a hairless, hard, horny hind pasterns and slightly splayed out hooves. This special modification of the hind legs prevents the pasterns from sinking in swamp. The bow-shaped antler has an extremely long brow-tine, the terminal tines vary from two to ten branches.

Size: Stags are about 120 cm high at withers; antlers may reach 107 cm in length; weight 95-110 kg. Hinds are smaller.

Distribution: Three subspecies are known extending from the northeast India through Burma to Indo-China, the nominate subspecies (*eldi*) is confined to the southern portion of the Logtak Lake in Manipur valley.

Habit, habitats etc.: This elegant deer lives on floating swamps which are composed of tall reeds, grasses and other hydrophyte which grow on a mat of humus. This floating mat is known as *Phumdi.* Such humus is about 3 metres thick of which four-fifth remains submerged in water and one-fifth outside. The taller grass species are mainly *Saccharum* sp., and *Phragmites* sp. The deer enjoys the terrain of open scrub jungle and the bog grassy float, feeding in the early mornings and evenings, and ocassionally trips in nearby crop field when crop is ready. The deer is generally gregarious and move about in parties of four to seven or more, it moves in great speed and has acute vision and keen sense of detecting its predator; stags become sexually mature in four or five years, rutting commences in March and April, mating takes place in May, generally a single fawn is born after a gestation period of 224-236 days. Care is extended to the fawn by the hind for one and a half year.

Status: The deer was in good number in Manipur State in the early part of the present century and till the Second World War the princely state extended full protection to this deer. During the War (1939-44) the Allied army ruthlessly hunted this animal as a result of which a few were left in Keibul Lamjao of the Logtak Lake. A count made by Gee in 1961 revealed only 100 deer and further survey conducted in 1972 and 1977 revealed only 50 and 18 heads. It appears there are not more than 35 heads left now in the wild, the population of this deer is however is increasing in captivity and today the zoological parks have some 50 bred deer.

THE SHOU

Cervus elaphus wallichi Cuvier

1823: *Cervus wallichii* G. Cuvier, *Oss Foss.* ed. 2, (4): p. 505. Nepal.

Local name: Tibetan: *Shou.*

Distinguishing characters: Almost similar to Hangul (Kashmir deer) but larger and heavier. In general, the colour of the Shou is lighter than the Hangul and the rump patch is large, light and more conspicious. The muzzle and chin are fawn-coloured *vis-a-vis* white in Hangul. It bears massive antlers which carry five points on each side. The brow-tine is less constantly longer than the second and closer to the burr; the terminal fork is placed at right angles to the axis of the head, the beam bending forward at the tray-tine upperhalf inclining to overhang the face.

Size: Stands at 140-150 cm at shoulder, antlers measure 152 cm.

Distribution: Southeastern Tibet, southeastern Nepal, Chumbi valley (Sikkim), Bhutan, northwestern parts of Arunachal.

Habits: Inhabits the temperate forests specially, rhododendron forests, wooded river valleys at elevation of 3000-4000 m, moving up and down with change of seasons.

Status: Some 100 years ago it was frequently met with in the Chumbi valley between Bhutan and Sikkim. It became spares, and the last authentic record is of F. Ludlow who observed three hinds in the area of Lingmothang in 1925 (Gee 1964, pp. 114-115)[1] and Colonel Renwick collected one specimen in 1921. Except for Tsari district in southeastern Tibet where a few exist, it has been exterminated from the Indian region.

THE ARGALI

Ovis ammon Linnaeus

Ovis ammon hodgsoni Blyth

1841. *Ovis hodgsonii* Blyth, *Proc. Zool., Soc.*, 65, Tibet, probably Nepal frontier.

Local names: Ladakhi: *Nayan* (male), *Nayanmo* (female); Tibetan: *Nyang.*

Distinguishing characters: A long-legged sheep, with a short non-fleecy coat, greyish brown above, whitish below; coat hair close and thick, in winter male bear a distinct fringe or ruff above the neck, female have no such mane; horns of the male fairly large, stout, strongly wrinkled, sub-triangular in section, the front surface distinct from the outer one, the outer angle rounded off but the inner one sharp, the horns never exceeds one circle; female usually hornless; both ram and ewe become paler in winter.

Size: Largest of all sheep, body length *c.* 1200-1500 mm, height at shoulder 1100-1200 mm; horns 900-1000 mm.

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[1] Gee, E. P. 1964. *Wild Life in India.* London.

Distribution: Central Asia plateau, within the Indian limits extends from Ladakh (Kashmir) in the west to northern Sikkim in the east.

Habits, habitats, etc.: An inhabitant of the montane areas, affects broken undulated sand hills, green slopes of valleys, natural clearings and desolate plains, ascending up to 4500 metres in summer and descending to the lower valleys in the winter; it being a grazer depends on variety of ground vegetation including sedges, grass, herbs, etc., foraging in evenings and early mornings, rests on stony slopes during the day; its vision is sharp which enables it to detect enemies at a moderate range, when startled it whistles to warn other members to move to a safety; ruts in late autumn, rams rush to strike at each other with their massive horns to determine supermacy to maintain the harem; fight among the rams can be made out by the sound of blows of horns that echo in the mountain valleys; gestation period is about five months, in May and June one or two youngs are born which are instantly on toes to follow their mother just after birth; the ewes attain sexual maturity in about 15 months and rams in 18 months.

Status: Endangered, numbers have been considerably reduced by over hunting for meat, fat, wool, and skin; competition with domestic sheep is also affecting the population to a considerable extent.

THE HISPID HARE

Caprolagus hispidus (Pearson)

1839 : *Lepus hispidus* Pearson in M'Clelland, *Proc. Zool. Soc. London,* 152.
Northern Assam, foot of Himalayas.

Local name : Assamese: *Ha Ha Pahoo.*

Distinguishing characters: The Hispid Hare is very much like a rabbit, distinguished from other hares from its small sized ears, small eyes, short and stout hind legs bearing long claws; upper parts dark brown to rusty red, fur coarse, shaggy and bristly; underparts brownish white, tail short, brown coloured.

Size: Length *c.* 740 mm; head and body 470 mm; tail 270 mm, height at shoulder 180 mm.

Distribution: Recorded range is from western Uttar Pradesh to northwestern Assam along the foohill belt of the southern Himalayas; at present restricted to northwestern Assam and also in a few isolated pockets of the Garo Hills, northern Bangladesh and possibly extending eastwards to Tripura and Mizoram (W.L.R. Oliver pers. comm.).

Habits, habitats, etc.: Inhabits thatch-scrub upland savannah, comprising grasses like *Themida, Saccharum* and *Phragmites* spp. This habitat is essentially well drained and thinly forested; an extremely shy and secretive hare, generally met with singly or in pairs; feeds mostly on different species of grass, thatch shoots, roots, barks, said to forage occasionally in adjoining paddy areas; in captivity fed on doob grass (*Cynodon dactylus*) and soaked dried peas (Mallinson 1971)[1]; breeds in March and April, may be two litters annually; litter size varies from one to five infants born in clumps of thatch in heavy cover, generally during wet season (Oliver 1980)[2].

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[1] Mallinson, J. J. C. 1971. A note on the Hispid Hare (*Caprolagus hispidus* Pearson 1839). *J. Bombay Nat. Hist. Soc.*, **68**(2): 443-444.
[2] Oliver, W. L. R. 1980. The biology and conservation of the Pigmy hog *Sus* (*Porcula*) *salvinus* and the Hispid hare (*Carpolagus hispidus.*) The Jersey Wildlife Preservation Trust Special Scientific Report No. 1.

Status: Severely endangered, almost standing at the brink of extinction. About a century back it had an extensive distribution from the Tarai to the Duars. It was quite common in Oudh as reported by Wilson (1924)[1]. In the early part of the present century Shebbeare frequently found it in Goalpara (Assam) and Buxa Duars (West Bengal) (Gee 1964)[2], and after a lapse of several years a specimen was collected by a German Expedition in 1956; it has recently been obtained from Rajgarh Reserve Forest and Attareekhat Tea Estate, Darrang District in 1971 (Mallinson 1971)[3]; infrequent records of it were made from Baranadi area, Manas Sanctuary in northwest Assam between 1971 and 1977. Recent reports of its presence in other parts of Assam need confirmation. Despoiling of habitat by annual grass burning and pressure exerted by man for agricultural expansion, habitation, etc., are the major causes of depletion of the remaining populations of the species in smaller pockets where it had been surviving. The viable population left now is in the Manas Reserve which is the only area where survival prospect of this threatened lagomorph still exists.

HODGSON'S HIMALAYAN PORCUPINE

Hystrix hodgsoni (Gray)

1847: *Hystrix hodgsoni* Gray. *Proc Zool. Soc.*, 101: Nepal

Local names: Bengali: *Pahari Sajaru;* Hindi: *Sahi.*

Distinguishing characters: A stout, heavy, almost a crestless porcupine; body covered with formidable elongated bristly spines; tail short and hidden amongst the quills which are hollow and when shaken produce a rattling sound; forelegs stout, broad and provided with four sharp claws, the hind foot has five toes.

Size: Length *c.* 780 cm.

Distribution: Central and eastern Himalayas, northeast to Naga Hills, also lower Bengal plains to altitude *c.* 1500 m.

Habits, habitats, etc.: Affects rocky hillsides, open wood land, deciduous as well as moist deciduous forests; generally found in pairs or in small groups, remains in self dug burrows; almost entirely nocturnal, feeds largely on vegetables, specially consumes roots and tubers also grain, fruit, etc., breeds in spring, gestation period is about three months, usually one to four young are born in a nest lined with leaves, grass and roots.

Status: Becoming rarer day by day since being hunted throughout its range of distribution for its flesh, also persecuted as it is considered a pest of agricultural crop.

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[1] Wilson, A. 1924. *Sport and service in Assam and elsewhere 256,* Hutchinson & Co. London.

[2] *Wildlife of India* 142-143. Collins Ltd. London.

[3] Mallinson, J. J. C. 1971. A note on the Hispid Hare (*Caprolagus hispidus* Pearson 1839.) Jersy Wildl. Pres. Trust. 8th Ann. Rep., 70.

NUTRITIONAL CONTRASTS AND THEIR EFFECTS

PRANAB GANGULY

IN 1936, in his Cantor Lecture delivered before the Royal Society of Arts, Sir Robert McCarrison declared, "Man is made up of what he eats". This statement is as true now as it was then. It is well known that nutrition has a profound effect at every stage of our life—from prenatal stage to extreme old age. Significant differences have been observed in birth weight between identical twins which are due to their unequal sharing of nutrients within mother's womb. The effects of these differences persist in after-years even though identical twins are genetically exactly alike (Willerman and Churchill 1967). It has been observed that the children (other than twins) who had low birth weight, particularly those who had a birth weight of 2000 gm or less, tend to suffer from severe skeletal growth retardation.

The need for food is of course not uniform throughout life. There is an increased need for protein, minerals, vitamins, and calories during pregnancy and lactation. Relatively more food is required per unit of body weight during the growth period of children. The requirement of calories gradually declines after early adulthood due to the decrease in basal metabolic rate and in physical activity. In elderly people aged 65 years and over the requirement of protein, minerals and vitamins remain at the level of young adults, but the calorie requirement is reduced by about 20 per cent.

Effects of nutritional stress

The effects of nutritional stress may be broadly divided into three categories: (*i*) the temporary changes in a human body which are reversible within the lifetime of an individual, (*ii*) permanent irreversible changes at individual level, and (*iii*) changes in the genetic endowment of a population that are handed over from generation to generation. The last category may eventually lead to the evolutionary adaptation of a population ensuring its survival in a particular ecological niche. We shall now proceed to discuss them briefly.

Plastic changes

In periods of short-term adversity such as shortages of food due to crop failure, the growth of a child may be slowed for a while; a pre-puberal child is nonetheless capable of a compensatory growth spurt after slowing. Intense but temporary environmental stresses have often had adverse effects on the body size of a people, but such effects usually disappear as soon as the conditions return to normal. In Japan, an increase of about 1 cm in average stature was observed in each decade since the beginning of the 20th century. This rising trend was interrupted by the acute shortage of food during the Second World War, and there was sharp decline in body height particularly among the adolescents. But the decline was soon made up, and the average stature of the Japanese in the late 1950's surpassed its pre-war level (Suzuki 1959). Some of the consequences of malnutrition, shown by Ivanovski (1923) in his study of the Russian population under famine, were not permanent in nature.

In this connection, it is interesting to note that slight deficiency in calories, but not in other nutrients, may not be as harmful as it is generally thought. The following quotation from Sinclair (1978: 149-50) is illuminating:

> "Some interesting experiments with rats and mice have shown that when fed on a diet deficient in calories but otherwise satisfactory they cease to grow, but can resume growth when an adequate supply of calories is restored. Rats have been kept immature for up to 1000 days on such a diet, and were still juvenile while their fellows on a normal diet were senile. On starting normal feeding, the rats rapidly grew to adult sizes although those which had been kept on the deficient diet for more than three years could not always begin growing again. Subsequent work has shown that the diet which results in the maximal final size of experimental animals is one which, as judged by appetite and by growth rate, represents a moderate degree of under-feeding".

We are not aware of any similar experiments conducted on human subjects, but if the above results hold true for human beings, it may be inferred that slight deficiency in calories may be beneficial at certain stages of human life and this may even lead to a prolongation of life span.

Seasonal variations in the incidence of nutritional deficiency signs have been reported in some studies. These are apparently due to the variation in the availability of food and changes in the purchasing power. In a study reported by Nadiger and Krishnamachari (1979) which was conducted among the urban school boys of an orphanage, seasonal variation in deficiency signs was observed although the intake of food was uniform throughout the year. The highest prevalence of malnutrition occurred in the winter. Greater requirement of food in the winter is perhaps the reason for this variation. Temporary deficiencies of specific nutrients may give rise to pathological conditions which are curable by administering the particular items in appropriate doses. For instance, diseases like anaemia and pellagra which are often the results of deficiency of iron and niacin respectively, are easily preventible and curable. Temporary malnutrition may have such manisfestations as weakness, lassitude, irritability, loss of hair, dermatitis, inflammation of the eye, and the like. The work capacity is reduced and the work output is adversely influenced. Inadequate nutrition also reduces the resistance of human body to a variety of diseases. Malnutrition and infection are often found to occur together.

Lasting effects

Let us now turn our attention to the more permanent effects of malnutrition. Individuals receiving deficient diets throughout childhood often fail to reach the full adult size. This residual stunting and reduced caloric need appear to be irreversible. Numerous studies conducted in Europe, U.S.A. and Japan show, on the other hand, that among the well-nourished people the general trend is toward increased prenatal growth, increased body length of neonates, accelerated growth in children and the earlier attainment of adult size. Apart from the differences in body size between the well-nourished and malnourished people, there are important differences in the incidence of morbid conditions. In the areas where protein-calorie malnutrition is endemic, diseases such as Kwashiorkor and marasmus are frequently encountered. Kwashiorkor is induced by protein starvation among children mainly belonging to the age group 1-3 years and is characterized by stunted growth, edema, etc., whereas marasmus involves the wasting of muscles and affects chiefly the babies under one. These diseases, as well as rickets, often leave indelible marks on the health of the children who are able to survive through them. Specific deficiencies, such as vitamin A deficiency, are major public health problems in many developing countries. Severe vitamin A deficiency may result in permanent blindness. It has been estimated that vitamin A deficiency is a contributing factor in about 20 per cent of all cases of blindness in India (Reddy 1978). Similarly, severe deficiency of iodine may induce goitre which has a lasting effect on the health of an individual. Furthermore, it is now well established that mental function may be altered as a result of severe malnutriation particularly very early in life. The brain can be damaged beyond recovery even during the intra-uterine life.

And we must remember that nutrition plays a very vital role in determining our longevity. A small experiment was conducted more than 50 years ago on two groups of rats (Sherman and Campbell 1928). Both the groups were from the same parental stock and reared under identical environment. One group was given a diet consisting of 1/6th dried whole milk, 5/6th ground whole wheat, and salt and water. The other group was given 1/3rd milk, 2/3rd wheat, and salt and water. The average span of life of the second group was almost exactly 10 per cent longer than that of the first group, and this was true for both the sexes. This simple experiment showed the important role of milk in the prolongation of life. That food is an important determinant of longevity has been demonstrated in many studies conducted among human beings. For instance, Beaubier (1975) has shown that life expectency of the Paros Islanders of Greece is unusually high (about 75 years in males and 80 years in females). Even the poorest amongst them eat well, and adults literally go hungry to ensure that their children are well fed.

Adaptation at population level

We now come to the important question whether genetic changes take place among human populations living in areas of endemic food deficiency and whether the process of natural selection operates against individuals having larger body size and greater need for calories and other nutrients. A number of studies conducted in England, India and Africa have revealed a positive correlation between lower birth weight and greater survivorship among children born of poor parents (Stini 1975). A study conducted in Peru provides evidence of higher rates of survival for infants born of parents with smaller body size (Frisancho *et al* 1973). These perhaps indicate that people having a smaller body and, therefore, smaller requirement of food, enjoy certain selective advantages under conditions of chronic nutritional stress.

Over-nutrition

We have so long been discussing about under-nutrition. Over-nutrition on the other hand, has its own ill effects. There is ample evidence that it has introduced obesity, diabetes, diseases of the heart and circulatory system, etc., among the excessively fed populations, particularly among the sedentary people of the upper socio-economic classes in many of the countries. Too much of a good thing may have harmful effects. For example, excessive consumption of vitamin A, as may occur when people take large amounts of vitamin preparations unnecessarily, can slow down the skeletal growth (Sinclair 1978: 151).

The world picture

The first worldwide survey of the Food and Agricultural Organization (FAO) estimated that, before the Second World War, more than one-third of the human population had less than 2200 calories per head per day; about one-third consumed between 2200 and 2700 calories, and the remaining one-third was well fed (Brockington 1975). The nutritional status of the world populations became worse during the Second World War, and at the end of the War nearly two-thirds of the humanity suffered from protein-calorie malnutrition with varying degrees of severeity. The position improved considerably within the next 20 years, but the under-developed and developing world continued to suffer. Dietary surveys of sample groups show that among the majority of the groups the diets suffer from a lack of balance, with excess of carbohydrate and too little protein. Today the areas of greatest deficiency are most of the Asian countries inclucing India, and some parts of Central America, South America, Africa, and Middle East. According to one estimate, 29 per cent of the world's population living in Europe, Oceania and North America consume 57 per cent of the world's food (Brockington 1975).

Situation in India

Scientific research in nutrition commenced in India in the present century only. The studies so far conducted reveal that the average household size is inversely correlated with the average calorie intake. In other words, the per capita food consumption is relatively less in larger families where there are many mouths to be fed (Bose 1977). Energy is supplied almost entirely by careals, whereas the protein intake fluctuates widely. The consumption of protein is very meagre among the poor people. To them meat, fish, and milk are luxuries which can be afforded only by the rich. Nearly 25 per cent of the poor children show signs of nutritional deficiencies (Bose 1977).

Many of the Indian babies have a very low birth weight which is closely associated with higher morbidity and higher mortality. A study conducted in Delhi showed that many of the children with a birth weight of 2000 gm or less suffered from severe skeletal growth retardation (Bhargava 1980). In 1965 an intensive survey was conducted in Midnapore district of West Bengal to study the growth of infants (Roy and Roy 1969). The survey revealed that the mothers were highly malnourished; the birth weight of the babies was on the average very low; malnourished mothers did not have good lactating capacity; and during the weaning period the majority of the infants were fed almost entirely on washed starch (Arrowroot flour and sago granules). It is, therefore, not surprising that the physical development of infants is very poor under this highly unfavourable nutritional environment.

Even in Punjab which is considered one of the best fed areas in India, malnutrition prevails among children. Many of the rural children of Ludhiana District have marasmus, anaemia, mouth and tongue lesions due to vitamin B deficiency and delayed closure of anterior fontanelle (Neumann *et al* 1969). A radiographic study of hand bones of the poor children in Chandigarh demonstrated that about 60 per cent of them had skeletal ages below their chronological ages (Prakash and Bala 1979). The position tends to be worse in certain other parts of the country.

Of the specific nutritional deficiencies, anaemia due to iron deficiency is an important public health problem in India. This type of anaemia is more frequently found among yougner children and women. Enademic goitre is another public health problem in some hill regions of the country. Although goitre can be effectively controlled by administering iodized salt, its control has proved difficult in India due to the lack of organised efforts.

In comparison with the food consumption in the affluent countries the Indian diet is poor indeed. It has been observed that it now takes five times as much land, water and fertilizer to support the average citizen in Western Europe as it does the average Indian (Brockington 1975). It has been the contention of some scholars that the maldistribution of food is the primary cause of malnutrition in our country. There can be no denying the fact that there is marked disparity in food distribution in different regions, different socio-economic groups, and even among different members of a household (Gopalan 1974). That there is a marked regional imbalance in the availability of food in India was first shown by Sir Robert McCarrison (1953) in his famous experiment conducted in 1920s. Seven groups of rats were given seven regional diets and were reared in otherwise identical conditions. At the end of 140 days (roughly equivalent to 140 months of ours) the animals were weighed and examined with regard to the incidence of diseases. The results obtained showed that the diets could be arranged in the following descending order of nutritive value: Sikh, Pathan, Maratha, Goorkha, Kanarese, Bengali and Madrasi. In brief, the Sikh diet of Punjab proved to be the best and the Madrasi diet the worst.

The differences in the quantity and quality of foods taken by the different socio-economic classes are so obvious that they require no elaboration. There are also considerable differences in the food intake by different members of a family. The low-income rural Indian female who represents the majority of the female population is under-nourished (Katona-Apte 1979). At meals, the wife feeds her husband first, then the children, and then herself. The major portion of meat, fish, egg, or milk, if available, are surved to the males. The greater need of nutrients of pregnant women and lactating mothers is seldom fulfilled. As a result, the children born of such women fail to show good physical development.

A lack of awareness of the nutritive and therapeutic values of foods and faulty traditional dietary habits appear to be important contributing factors to the ill health of the people. For instance, recent investigations among the Jain community indicate that the routine consumption of onion and garlic has beneficial effects among them in maintaining the normal levels of cholesterol and other serum lipids (Sainani *et al* 1979), but any effort to change the dietary habits of conservative people is likely to be met with stiff resistance. One of the most urgent needs of our country is proper health education with special emphasis on food and nutrition. Although we have a Central Health Education Bureau at New Delhi which is engaged in important research and promotional activities, its impact is yet to be felt among the common people.

Nutrition and body size

It has been shown elsewhere that in some sections of the Indian population the dominant trend is toward a diminution of body height (Ganguly and Pal 1974, Ganguly 1979). Of the 60 population groups studied, as many as 43 groups became shorter in the course of one or two generations. Malnutrition is perhaps one of the contributing factors in the reduction of body height of the Indian people. Hamilton (1838) furnished some data concerning food habits of the early 19th century people of Eastern India. His material represents frequencies of consumption of particular foods at least once every month. In table 1, we have compared these percentages with the corresponding percentages relating to 1953-54 obtained from the seventh round of the National Sample Survey (Mukherjee 1969). It appears that there has been some fall in recent times in the percentages of families consuming items such as meat, fish, milk, and pulses which are rich in protein. The evidence is not adequate to infer that malnutrition is the sole cause of reversed secular trend in stature in India. It, however, appears to be one of the causative factors.

Finally, it may be asked that improvements are expected to occur in the physical standards of the Indian people if the nutritional status of our country improves in course of time, which is quite likely. It is very difficult to determine the optimum environmental conditions under which the genetical potentialities of the people can be fully realized. A simple way of estimating the expected improvement in physique is to compare the poor people with the well-to-do people. A carefully designed survey was conducted among the well-to-do and poor sections of the Brahman and Muslim population in 12 districts of Western Uttar Pradesh (Ganguly 1974). The results of the survey show that the well-to-do people are on the average taller by more than 2 cm and heavier by more than 8 kg than the poorer section of the population (Table 2). At the least, this much of increase in body height and body weight of the common masses in our country is expected to take place along with the improvement in the standard of living, particularly the standard of nutrition.

Over the last two decades, considerable efforts have been made in our country to increase the production of food through the development of high-yielding varieties of foodgrains, and by using larger doses of chemical fertilizers (Deosthale 1978). Some attempts have also been made to augment the production of vegetables, fruits, dairy products, as well as to increase the poultry and livestock by artificial means. But mass production of food has its own drawbacks. We can do know better than quote the following few lines from Alexis Carrel (1946: 115-16), a Noble Laureate in physiology and medicine, to make my point clear:

> "The staple foods may not contain the same nutritive substances as in former times. Mass production has modified the composition of wheat, eggs, milk, fruit, and butter, although these articles have retained their familiar appearance. Chemical fertilizers, by increasing the abundance of the crops without replacing all the exhausted elements of the soil, have indirectly contributed to change the nutritive value of cereal grains and of vegetables. Hens have been compelled, by artificial diet and mode of living, to enter the ranks of mass producers. Has not the quality of their eggs been modified? The same question may be asked about milk because cows are now confined to the stable all the year round, and are fed on manufactured provender."

TABLE 1

Percentages of families consuming specified items of food at least once a month

Items of food	Early nineteenth century	1953-54
Meat	39	34
Fish	86	73
Ghee (clarified butter)	9	9
Milk	92	67
Sugar	100	62
Pulse (curry)	80	52
Vegetables	59	77
Spices	44	85
Oil	74	90
Salt	96	98
Rice	81	93
Wheat	41	44

Source: Mukherjee (1969: 448-49)

TABLE 2

Mean values of the Brahman and Muslim series

Measurements	Brahman well-to-do (n=200)	Brahman poor (n=200)	Muslim well-to-do (n=200)	Muslim poor (n=200)
1. Weight	60·0	51·1	57·0	48·4
2. Stature	1669·6	1646·3	1668·0	1639·4
3. Biacro. br.	379·2	368·7	375·7	364·5
4. Bi-iliac. br.	285·3	274·4	280·3	267·2
5. Neck girth	333·1	316·9	330·9	313·3
6. Chest girth	868·6	815·7	853·8	804·5
7. Abdom-girth	774·4	702·1	747·6	675·0
8. Up. arm girth	260·3	248·5	255·0	229·6
9. Calf girth	316·7	291·4	308·1	284·2
10. Sitting ht.	867·6	854·1	866·1	843·2
11. Head length	192·7	191·2	191·5	188·2
12. Head br.	142·4	139·3	143·7	140·4
13. Bizygo. br.	135·6	133·0	135·2	132·8
14. Facial ht.	116·1	116·5	117·7	115·9
15. Nasal ht.	52·7	52·3	53·0	51·6
16. Nasal br.	37·0	36·4	36·9	35·9

(Weight is given in kilograms and other measurements in mm.)

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NOTES ON A COLLECTION OF GRASSHOPPERS (ORTHOPTERA : ACRIDIDAE) FROM THE SIWALIK HILLS

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ABSTRACT

The paper comprises of 19 species and subspecies of grasshoppers (Orthoptera: Acrididae) from some localities of Siwalik Hills (Outer Himalayas) out of which 12 species are new records to the area. The availability of the subspecies, *Eyprepocnemis alacris impicta* Uvarov, 1933, is a new record for India. Some of the species are illustrated by photographic profiles. Additional remarks of taxonomic value and measurements are provided for some species.

Introduction

THE grasshopper fauna of the Western Himalayas is little known. In fact, there is no consolidated account of these highly economic pests from the area. Only a few species have been referred to casually. Lately one of us (H.K.B.) has collected some specimens from the Siwalik ranges. The study of these material has revealed 19 species and subspecies of the grasshoppers, of which 12 species (marked with asterik) are newly recorded from the area. It is needless to say that further and detailed collection from the locality will give much information about the faunal composition of these interesting insects.

For the known species only additional characters of taxonomic importance have been provided; some of the species have been illustrated by photos and measurements have been given, wherever felt necessary. Besides, taxonomic account data have been furnished in respect of the zoogeographical distribution.

Abbreviations for names of states, as H.P. for Himachal Pradesh and so on have been used. And also M and F denote male(s) and female(s) respectively. Since the senior author himself is the collector for all species, collector's name is not repeated under "material". Lastly we expess our thanks to the Director, Zoological Survey of India for providing working facilities.

SYSTEMATIC ACCOUNT

Class—Insecta
Order—Orthoptera
Family—Acrididae

*1. *Phlaeoba infumata* Brunner

Phlaeoba infumata Brunner, 1893. *Annli. Mus. Civ. Stor. nat. giacomo Doria Geneva*, **13** (33); 124.

Distribution: India (Pusa; Cuttack), E. Nepal and also from Burma.

Material: 2F; Bank of Ghargar R., Panchula, Haryana; 3.10.1982. 1M; Chakki, Nurpur, Kangra, H.P.; 14.10.82.

Remarks: The species is a new record for northwestern India. The specimens at hand essentially agree with known descriptions. Only a few minor features can be added. Antennae (9 mm) slightly shorter than head and pronotum (10-11 mm) together. Frontal ridge distinctly sulcated, the bordering carinae prominent, a little divergent towards clypeus, and alternately coloured with brown and yellow. Prozona almost as long as metazona. Tegmen as long as wing. Posterior tibia with 11 internal and 12 external spines.

*Measurements (*Females in mm*):* Length of body 30·5-31; pronotum 5·5-6; tegmen 25-26; posterior femur 16·5-17; posterior tibia 14-15.

*2. *Ceracris nigricornis laeta* (Bolivar)

Ceracris nigricornis Walker, 1870, *Cat. Derm. Salt. Br. Mus.*, **4**: 791. *Ceracris nigricornis laeta:* Uvarov, 1925. *Ent. Mitt.*, **14**: 13-14.

Distribution: Darjeeling, Sikkim and also from South China and Taiwan.

Material: 1F; Ghargar R. side, Panchula, Haryana; 3.10.82.

Remarks: The subspecies is recorded here for the first time from Haryana.

*3. *Dnopherula (Aulacobothrus) socius* (Bolivar) (Fig. 1)

Aulacobothrus socius Bolivar, 1902. *Annls. Soc. ent. Fr.*, **70**: 599.

Distribution: Tamil Nadu (Kodaikanal, Madura).

Material: 2F; Nurpur, H.P.; 15.10.82.

Remarks: It is new record for Haryana.

*4. *Leva mundus* (Walker)

Stenobothrus mundus Walker, 1871. *Cat. Derm. Salt. Br. Mus.*, **5** *(supple)*: 79.

Distribution: Bombay.

Material: 2M; Pinjore, Kalka, Haryana; 30.9.82 and 1.10.82.

Remarks: The species (M 15 mm) is yet inadequately known. Frontal ridge moderately sulcated, almost parallel sided. Median carina of pronotum distinct; lateral carinae obliterated on the metazona. Supra-anal plate tongue shaped; cercus elongated; subgenital plate navicular, pubescent. It is a new record for Haryana.

5. *Aiolopus thalassinus tamulus* (Fabr.)

Gryllus tamulus Fabricius, 1798. *Ent. Syst., Supple:* 195.

Distribution: Common throughout oriental region.

Material: 1M, 1F; Murui, Ambala, Haryana; 3.10.82. 2F; Hoshiarpur, Punjab. 8.10.82. 1F; Fahira, Chamba, H.P.; 16.10.82. 1M, 3F; Mulla, Ambala, Haryana. 4.10.82.

Remarks: This subspecies is a very common agricultural pest in India.

*6. *Pusana laevis* Uvarov (Figs. 2-4)

Pusa laevis Uvarov, 1921. *Ann. Mag. nat. Hist.*, **7** (9): 491-492.

Distribution: Bihar (Pusa); Himachal Pradesh; Sikkim. Also from Bangladesh.

Material: 2M, 3F; Hoshiarpur, Punjab; 8-10.12.82. 6F; Bharvain, Hoshiarpur, Punjab; 9.10.82. 2M; Nurpur, Kangra, H.P.; 13.10.82.

Remarks: The specimens at hand agree well with the original description. Antennae alternated with brown and pale segments. Posterior margin of metazona rounded. At Hoshiarpur area the insects were found in abundance. They were always noticed in company with the species, *Acrotylus humbetianus*, in sand dune habitat, with spare grasses (fig. 4), completely camouflaging with their sandy environment.

The availability of a nymph (11 mm) in this time, which is almost identical to adults, except without wings and with ill developed genitalia, indicates that the species breeds after monsoon.

The species is recorded here for the first time from Punjab. Photos of male are added.

7. *Gastrimargus africanus africanus* (Saussure)

Oedaleus marmoratus var. africana Saussure, 1888. *Mem. Soc. Phys. Hist. nat. Geneva*, **30** (1): 39.

Distribution: Common throughout India, Arabia and Africa.

Material: 1M, 4F; Nurpur, Kangra, H.P.; 13.10.82. 1F; Parbanoo, Kalka, Haryana; 2.10.82. 1M, 1F (and a nymph); Chakki, Nurpur, Kangra, H.P.; 14.10.82.

8. *Oedaleus abruptus* (Thunberg) (Figs. 5-6)

Grylly abruptus Thunberg, 1815. *Mem. Acad. Sci. St.—Petersb.*, **5**: 233.

Distribution: Widely distributed throughout east Asia.

Material: 2M, 1F; Nurpur, H.P.; 13.10.83. 1F; Chauri, Chamba, H.P.; 17.10.82. 3F; Parbanoo, Kalka; 2.10.82. 1F; Murui, Ambala, Haryana; 3.10.82.

*9. *Acrotylus humbertianus* Saussure (Figs. 7-8)

Acrotylus humbertianus Saussure, 1884. *Mem. Soc. Phys. Hist. nat. Geneva*, **28** (9): 198.

Distribution: Widely distributed in India: Bihar: Pusa (on lentils), Chapra. M.P.: Katni. Tamil Nadu: Shevaroys (on coffee). Bombay: Buslar (sand dunes). Sri Lanka, Pakistan and Afganistan.

Material: 4M, 2F; Hoshiarpur, Punjab; 11.10.82. 4F; Dasua, Hoshiarpur; 11.10.82. 2M, 2F; Garhshankar, Hoshiarpur, Punjab; 7.10.82. 2F; Una, Hoshiarpur; 10.10.82. 3F; Bharain, Hoshiarpur; 9.10.82.

Remarks: It is one of the commonest grasshoppers. At Hoshiarpur it was always found with *P. laevis* in sandy habitat.

*10. *Pseudosphingonotus savignyi* (Saussure)

Sphingonotus savignyi and strips *apicalis* Saussure, 1884. *Mem. Soc. Phys. Hist. nat. Geneva*, **28** (9): 198, 208.

Distribution: India (Ladakh), Pakistan, North Africa, Central Asia, Afganistan and Russia.

Material: 5M, 5F; Nurpur, H.P.; 13.10.82.

Remarks: Mostly a palaeartic species. It is recorded here for the first time from H.P. The specimens at hand are shorter in size.

Measurements (in mm)	M	F
Length of body	15·0-17·0	22·5-24·0
Length of pronotum	2·5- 3·5	3·4- 4·6
Langth of tegmen	17·0-18·0	21·5-22·6
Posterior femur	10·0-11·0	11·0-12·5
Posterior tibia	6·0- 7·0	8·0- 9·0

11. *Scintharista blanchardiana* (Saussure) (Figs. 9-10)

Quiroguesia brullei var. *blanchardiana* Saussure, 1888. *Mem. Soc. Phys. Hist. nat. Geneva*, **30** (1): 35.

Distribution: Northwestern India; Bombay. Also from Somaliland, Arabia and Palestine. Recently Bhowmik and Halder (1981) recorded 2F from H.P.

Material: 4M; Nurpur, H.P.; 13.10.82.

Additional description: Males: Antenna brownish, much longer than head and pronotum. Head reddish with scattered bluish grey markings, no stripes treachable. Face punctured throughout. The bordering carinae of frontal ridge distinct; a little divergent apically; lateral carinae distinct, concave from outside. Prozona shorter than metazona, constricted and traversed by 4 sulci including the hindermost one. Lateral pronotal lobe much higher than long; densely and coarsely punctured. Wings greenish yellow basally, the bordering band dark brownish in colour. Mesosternal plates transverse, their inner margins rounded; metasternal plates separated. Supra-anal plate tongue shaped. Subgenital plate navicular, apex upturned, hairy. Cercus conical, hairy, shorter than subgenital plate. Posterior tibia without external apical spine.

Measurements: (Males in mm) Length of body 22·5-23·5. Head 3·0-3·25. Length of prozona 2·25-2·5 and metazona 2·5-3·0. Tegmen 24·0-25·0. Wing 23·0-24·0. Posterior femur 12·0-13·0. Posterior tibia 12·0-12·5.

Remarks: The specimens were collected from stones of a hillock, on which the insects were camouflaging with the habitat. Apparently they were warming themselves in the mid-day sun, sitting motionlessly.

12. *Xenocatantops Karnyi* (Kirby)

Catantops Karnyi Kirby, 1910. *Syn. Cat. Orth.*, **3**: 483.

Distribution: More or less throughout India and Nepal.

Material: 1M; Fakira, Chamba, H.P.; 16.10.82. 3F; Kangra, H.P.; 15.10.82.

Remarks: The species is distinguishable for having a row of black dots along the lower—outer carina of posterior femur.

*13. *Hieroglyphus nigrorepletus* (Bolivar)

Hieroglyphus nigrorepletus Bolivar, 1917. *Rev. Acad. Cienc. Madrid*, **16**: 397.

Distribution: Assam (Cachar).

Material: 1M, 1F; Pinjore, Kalka, Haryana; 1.10.82.

Remarks: Both the specimens are brachypterous. The colouration of pronotum, abdominal dorsum and "knee" of posterior tibia is characteristic and helps in easy spot identification.

*14. *Parahieroglyphus bilineatus* (Bolivar)

Hieroceryx bilineatus Bolivar, 1912. *Trab. Mus. nat. Cienc. nat. Madr., no.* 6. (*Zool.* no. 4): 60-61.

Distribution: Bengal.

Material: 1M, 1F; Pinjore, Kalka, Haryana. 1.10.82.

Remarks: The species is greenish in life except posterior femur, antenna and abdomen which are light refous. The longitudinal narrow black line which continues backwards up to almost to the tip of tegmen is the differential feature. Through the present species and the proceeding one were collected from the same bush and apparendly look alike, the colour bands easily distinguish them. The male (22 mm) of the species is also shorter and slender than the male of preceding species.

*15. *Cataloipus himalayensis* Singh and Tandon (Figs. 11-12)

Cataloipus himalayensis Singh and Tandon, 1978. *Bull. Zool. Surv. India,* **1** (1): 61-64.

Distribution: Western Himalayas (Nainital, Almorah, Kangra, Rupar, Hoshiarpur).

Material: 1M, 1F; Pinjore, Kalka, Haryana; 30.9.82.

Remarks: This is perhaps the first record of the species since its description. The specimens (M 31-33, F 53-54) agree well with the original descriptions, differing in the following minor points—Males: Tegmina as long as abdomen (22·5 mm). Lateral carinae of face almost straight; diverging and obliterated distally. Lateral pronotal lobes as long as high; its posterior margin concave and obliquely rounded posteriorly. Prozona nearly double of metazona. Posterior femur attenuated apically, "knee" dark black. Posterior tibia pilose, with 14 to 15 external and 11 internal spines; posterior metatarsi bluish dorsally, ventrally the pads rufous. Females: Tegmina (35-36 mm) slightly shorter than abdomen. Supra-anal plate shallowly depressed dorsum. Valves of ovipositor curved, turned up or downwards, apices black. Posterior tibia with 13 external and 11 to 12 internal apines.

*16. *Choroedocus illustris* (Walker)

Heteracris illustris Walker, 1870. *Cat. Derm. Salt. Br. Mus.,* **4**: 622, 623.

Distribution: South India; H.P.

Material: 1M, 3F; Parbanoo, Kalka, Haryana; 2.10.82.

Remarks: Lately Bhowmik and Halder (1981) have described the males from H.P. with illustrations and measurements. It is, however, a new record for Haryana.

*17. *Heteracris nobilis* (Uvarov)

Thisoicetrus nobilis Uvarov, 1942. *Ann. Mag. nat. Hist.,* **9** (11): 596.

Distribution: Lyallpur (Punjab); Himachal Pradesh; Pakistan (Baluchistan and Sind).

Material: 1M; Mulla, Ambala, Haryana; 4.10.82.

Remarks: The species is recorded here for the first time from Haryana and seems to be available throughout Northwest India.

18. *Eyprepocnemis rosea* Uvarov

Eyprepocnemis roseus Uvarov, 1942. *Ann. Mag. nat. Hist.*, **9** (11): 597, fig. 4R.

Distribution: H.P.; U.P.; Meghalaya (Shillong).

Material: 1M, 2F; Chakki, Nurpur, Kangra, H.P.; 14.10.82. 1M, 1F; Nurpur; 13.10.83. 2F; Kangra, H.P.; 15.10.82. 1M, 3F; Pinjore, Kalka; 5.10.82.

Remarks: The species is very common throughout the Western Himalayas. Lately Bhowmik and Halder (1981) (in Press) has remarked on it.

*19. *Eyprepocnemis alacris impicta* Uvarov

Eyprepocnemis alacris impicta Uvarov, 1933. *Trud. Inst. Zool. Acad. Sci. U.S.S.R.* (1932) **1**: 232.

Distribution: Pakistan; S.W. Persia; Iraq; S.E. Arabia.

Material: 1M; Ghargar R. side, Panchcula, Haryana; 3.10.82.

Remarks: According to the revisional works of the genus by Dirsh (1958), the sub-species is recorded here for the first time from India. The other sub-species, *E. a. alacris* (Serville, 1839) is rather common in India.

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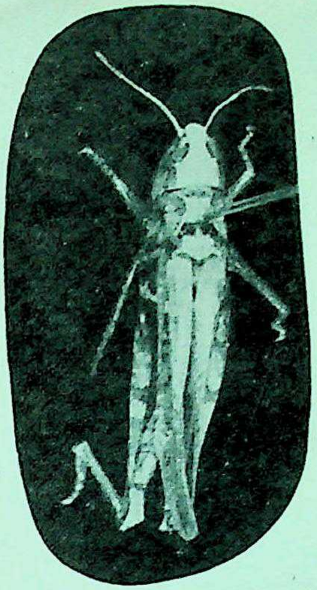
PLATE 1



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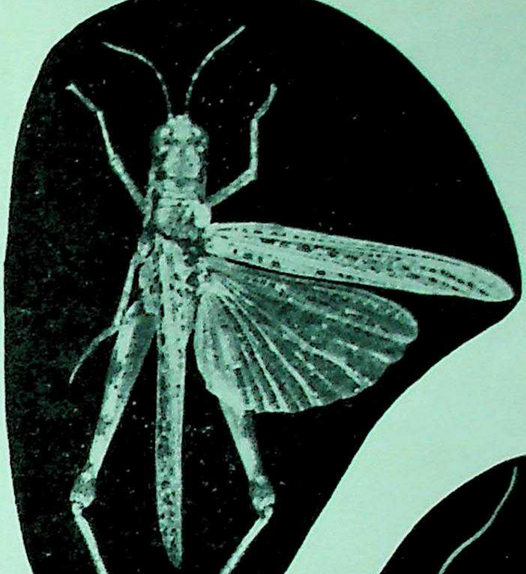

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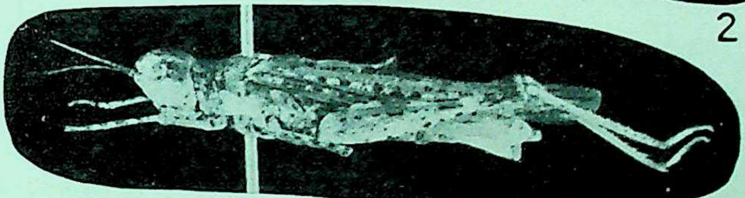

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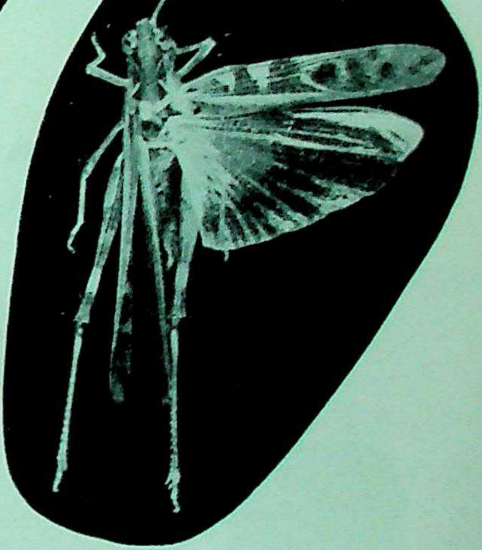

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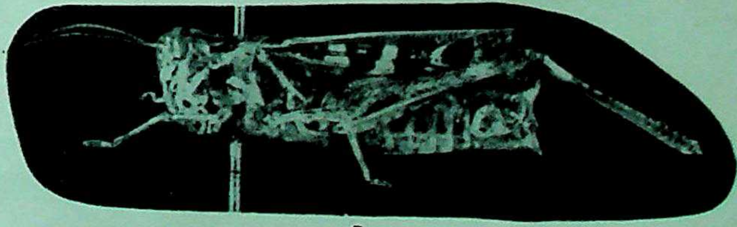

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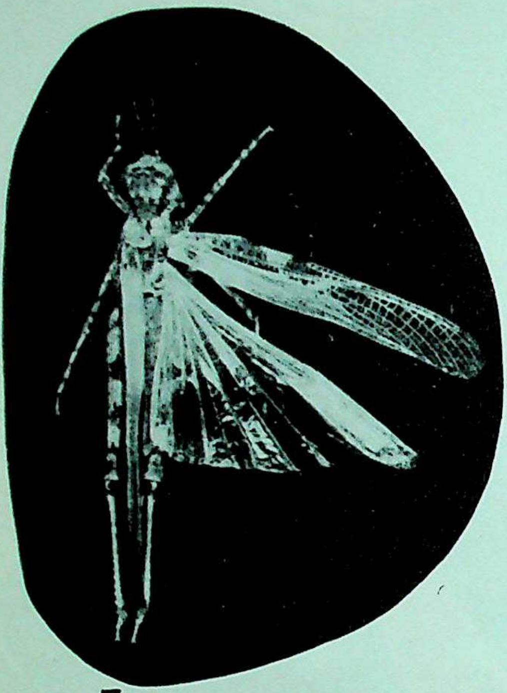
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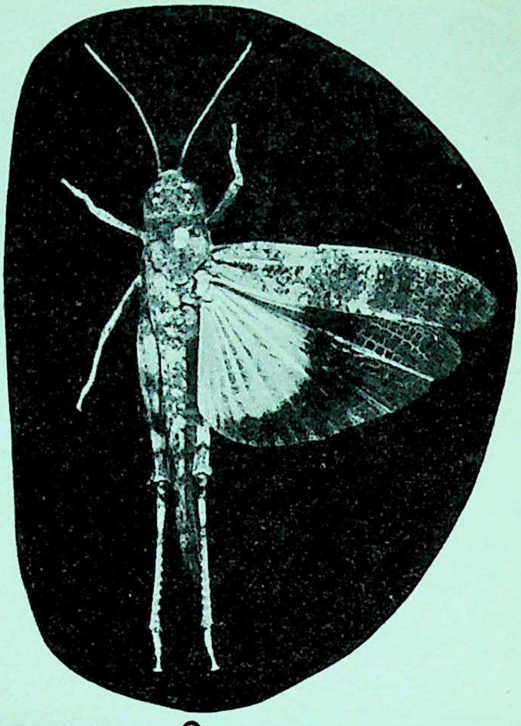
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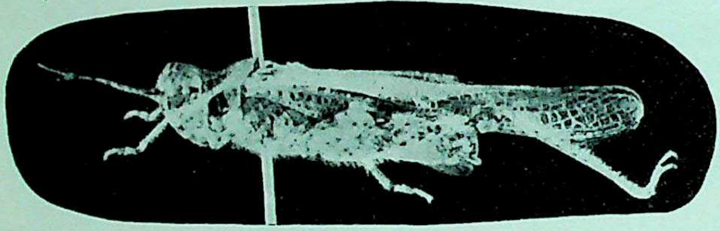
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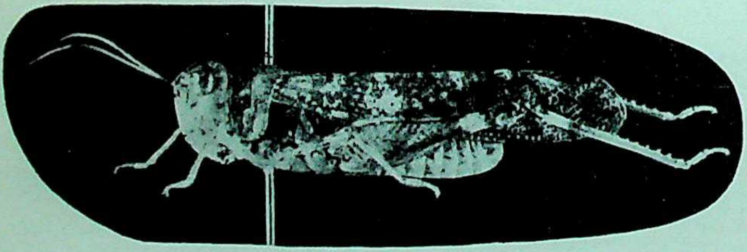
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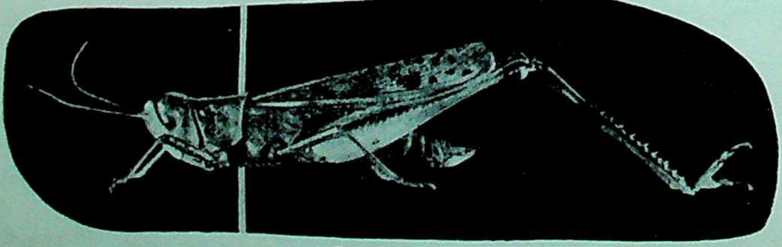
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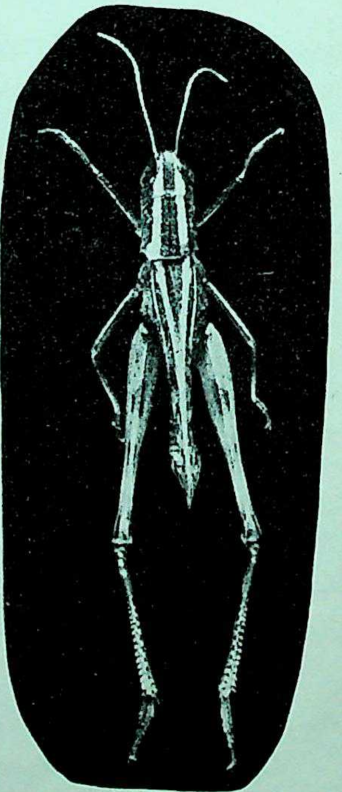
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EXPLANATION OF PLATES

Fig. 1. *Dnopherula (Aulacobothrus) socius* Bolivar, dorsal view (F)

Fig. 2. *Pusana laevis* Uvarov, dorsal view (M)

Fig. 3. *P. laevis* Uvarov, lateral view (F)

Fig. 4. Sandy dune habitat of *P. laevis*

Fig. 5. *Oedaleus abruptus* (Thunberg), dorsal view (M)

Fig. 6. *O. abruptus* (Thunberg), lateral view (F)

Fig. 7. *Acrotylus humbertianus* Saussure, dorsal view (M)

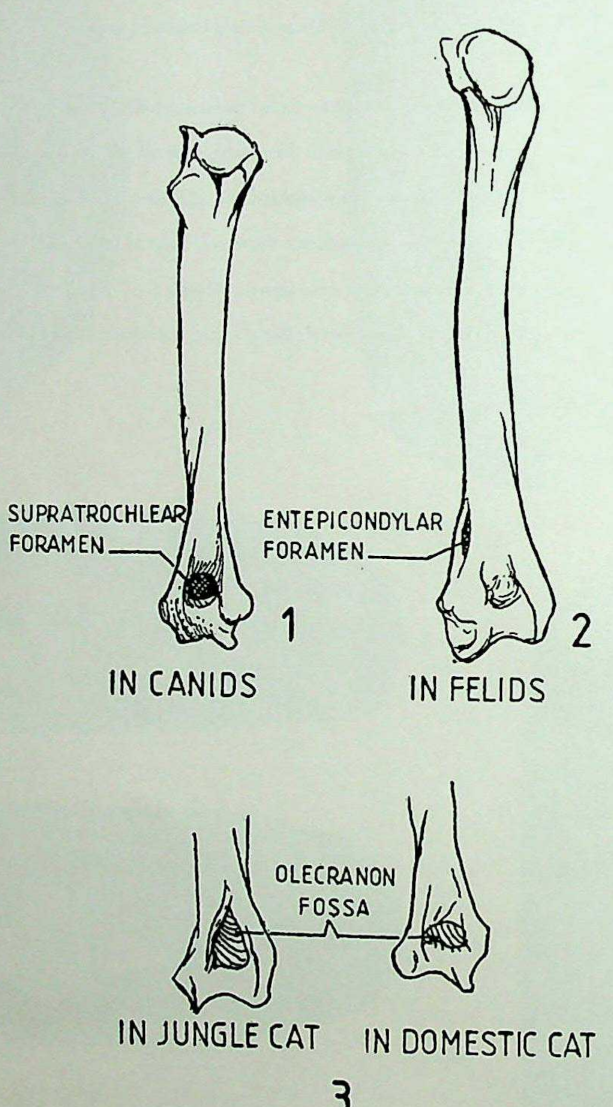
Fig. 8. *A. humbertianus* Saussure, lateral view (F)

Fig. 9. *Scintharista blanchardiana* (Saussure), dorsal view (M)

Fig. 10. *S. blanchardiana* (Sauss.), lateral view (M)

Fig. 11. *Cataloipus himalayensis* Singh and Tandon, dorsal view (M)

Fig. 12. *C. himalayensis* Singh and Tandon, lateral view (M)



Figs. 1-3 *Showing special features of different humerus*

THE REVIEW ON THE REMAINS OF 'DOMESTIC CAT' FROM HARAPPA, NAGDA AND NAGARJUNKONDA, IN INDIAN SUBCONTINENT

M. GHOSH

ABSTRACT

The result of the review reveals that none of the remains belongs to domesticated cat, instead, they were of Bengal fox, Caracal and Jungle Cat. The occurrence of Jungle Cat from a number of settlement sites and its pattern and colouration of the coat which are very often exhibited in the Indian Domesticated Cats, indicate strongly the eligibility of its place among the ancestors of the modern breeds of Domestic Cats in Asia.

Introduction

PRASHAD (1936) following Hilzheimer (1913) and Pocock (1907) assigned some remains unearthed from Harappa, which he studied as *Felis ocreata* Gmelin, race *domesticus* Brisson (p. 7, 8, 15-17). His identification was based on the specimens of one broken skull and one humerus of the left side. This discovery was considered to be the first and earliest record of ancient remains of Domestic Cat from Indian subcontinent.

Later on Nath (1966) claimed to identify one complete right humerus from the site of Nagda (Period II *i.e.* c. 850-500 B.C.) and also one broken left humerus from the historic site of Nagarjunkonda as remains of Domestic Cat, *Felis catus* Linnaeus following Archaeological convension of Nomenclature for Domestic Animals. Any how, he also followed up the prevailing general concensus about the origin of Domestic Cat (Nath 1961) and emphasised that Indian Domestic Cats were originated from Egyptian Wild Cat, which were tamed by ancient Egyptians and were introduced to Middle East and India through the Phoenisian traders round about 600 B.C. (p. 361, 362).

But before reaching such conclusion had Nath kindly checked up Prashad's material or put a little more attention with his own material he could perhaps apprehend that they were somewhat different from the true Domestic Cats. Even for the Nagda specimen, inspite of the slenderness of the shaft and longer length, which drew his attention also (p. 18), he didn't feel to compare it with any other nearer conspecific and endemic species of lesser cat. So, his contention is doubtful.

It is apparently true that mammalogists generally pay less attention on the appendicular skeletons and rely much on the craniology for specific determination. But comparative studies on appendicular skeletons (Mandal, 1972, Mandal & Talukdar 1975, Jenknis & Camazine 1977, Cantuel 1955, etc.) very often gives stricking results to distinguish even closely related species of Felids.

The detail of the specimens (Plate Nos. 1 & 2) re-studied, their diagnostic characters and result of the review are summarised as follows:

I. MATERIAL from Harappa, Montogomery district, Pakistan. Specimen marked C. Left humerus; Arch. data: 7851, Mound F. Great Grannary area, square I9/3; depth 3′10″. Identified by Prashad (1936) as *Felis ocreata* Gmelin, race *domesticus* Brisson.

Re-study reveals: The humerus lacks the entepicondylar or Supra condylar foramen. It is a constant character in entire Feline group (fig. 2) so its absence readily separates it from earlier diagnosis. On the other hand presence of supra trochlear foramen drew attention which is a common feature in the canids (fig. 1) under which the species of *Vulpes* belong and was taken into consideration for its size. The osteometric measurements (Table No. 1) show that it is similar to the specimen of *Vulpes bengalensis* Shaw (Specimen No. D), commonly known as the Bengal Fox in size and shape.

Specimen Marked A. Broken skull, without jaws and left tympanic bulla, of an young one; Arch data: Mound F, Great Granary area, square J8/2; depth 5′. Identified by Prashad (1936), same as *Felis ocreata* Gmelin, race *domesticus* Brisson.

Re-study reveals: The non-ossified sutures indicate the skull was of a juvenile specimen. The shorter parietal and cranial widths are like those of the domesticated adult cats (Specimen No. B), and probably were liable for its erroneous identification. The skull, though didn't reach its full growth, yet possesses greater frontal length, wide apart paramastoid process. Moreover the voluptuous tympanic bulla indicate it belongs to a bit larger and wild species of lesser cats and when compared with that of a *Felis caracal* Schreiber (Table No. 2), commonly known as Caracal it shows close similarity.

II. MATERIAL from Nagda, Chambal Valley, Madhya Pradesh, India. Specimen marked F. One complete right humerus; Arch. data: NGD, 1-40; Period II. Identified by Nath (1966) as *Felis catus* Linnaeus.

III. MATERIAL from Nagarjunkonda, Guntur district, Andhra Pradesh, India. Specimen marked E. One distal fragment of left humerus; Arch. data: Stratum (5); Locus B-19; depth 6′; dt. 25-2-56. Identified by Nath (1968) as *Felis catus* Linnaeus.

Re-study reveals: Both the specimens of humerus from Nagda and Nagarjunkonda have slender and longer shafts than those of the typical domesticated cats (Specimen No. H). The shaft in the domesticated cats are broad in proportion to the proximal and distal condyles. The olecranon fossae are also narrow and deep in these specimens and their appearance is rather triangular. In the Domestic Cat, it tends to be oval and concentrated (fig. 3). The delotoid ridge is stronger in the specimens from Nagda and in both the supenator ridges are little longly extended upward. The entepicondylar foramen is also bit longly sulcated in these specimens. The osteometric comparison (Table No. 3) clearly confirms that the specimens from Nagda and Nagarjunkonda belong to *Felis chaus* Guldenstaedt, commonly known as the Jungle Cat (Specimen No. G).

Discussion: From the re-study on Harappan specimens, we learn that two more species of mammal, namely the Bengal Fox and the Caracal lived in the Harappan settlement about 2000 to 3000 years B.C. and no remains of Domestic Cat occured from the site.

The review on the Nagda and Nagarjunkonda specimens confirms that they belong to the Jungle Cat and not to Domestic Cats.

(*i*) The Bengal Fox still inhabits the area of Pakistan, Afghanistan, Sind and Punjab besides its major distributional area in Central, Northern and Eastern India (Ellerman, JR & Morrison Scott, T.C.S. 1951). This animal prefers to live in the burrows in open countries and generally avoids dense forests. Probably the fox did not play any important role in the economic set up of early men (Zeuner, 1963). The fox often comes close to the vicinity of human habitation. So it is not very astonishing to find its remains from the settlement area. However, the remains of Bengal Fox from Harappa constitutes the first record of its occurrence from the Archaeological sites in the subcontinent studied so far.

(*ii*) The Caracal had a fair distribution in Sind, Punjab, Afghanistan and Central India only a few decades ago. It is now much rare and is enlisted as endangered species. The animal prefers to live in dry low countries with scattered bushes. Evidences are there that the animal was used to be tamed like the Cheetah for capturing small game animals and birds as a prehistoric technique for the collection of food. Occurrence of prehistoric remains of caracal has not been recorded from any other site in the subcontinent studied so far.

(*iii*) The Jungle Cat is very common and is fairly distributed in the subcontinent including Ceylon. It prefers to live in the forests and generally keeps away from human habitation. Earlier remains of the Jungle Cats were found from the prehistoric sites of Rajghat, Varanasi (Nath, in press); Kalibangan, Rajasthan (Banerjee & Mukherjee 1976) and Kausambi, Allahabad (Banerjee & Ghosh 1981). Now Nagda and Nagarjunkonda are added as two more sites of its occurrence. The remains from the aforesaid places are appeared to be of subadult specimens. The occurrences of Jungle Cat from the settlement area is very interesting as it may throw some light on the domestication of cat. But unless sufficient material is unearthed, it is not possible to say whether they were ever kept as captive animals or not. Probably the Jungle Cat might have some role as ancestor of the present day breed of cat found in the subcontinent. Very often the Indian domesticated cats exhibit colouration characteristic of the Jungle Cat, *i.e.* yellowish grey and the tails are also seen annulated with black and unlike the Egyptian cats, they generally lack the black patch on their hind soles. These characteristics were observed and reported very early by Blyth (1856) also Sclater (1891) of course defined it as a result of frequent crossing between the Jungle Cat and Domestic Cat. The smaller size of the Domestic Cat (in comparison to Jungle Cat) and proportionately longer tail are typical and it is not easy to ascertain whether these changes are resulted from prolonged domestication or from the crossing with introduced forms. Reduction of size and induced morphological changes have been observed by Cantuel (1955) in the European Domestic Cat in relation to its wild progenitor *Felis sylvestries* Schreiber.

However, from the antiquities and archaeological evidences which were recovered exclusively from Egypt it is strongly believed (Mivert, 1881; El-Monaiery, 1965) that the Egyptian Wild Cat, *Felis meniculata* Cretzschmar, was the progenitor of major cat races. But at the sametime, the morphological distinctions in different breeds in Asia and Europe are suggestive of their polyphyletic origin.

Conclusion

The result of the review contributes further knowledge on the ancient distribution and occurrence of the three aboriginal species of mammal *viz*. Bengal Fox, Caracal and Jungle Cat, out of which the Caracal is on the verge of extinction at present. It also imparts some knowledge about the then ecological condition that prevailed in those localities. From the occurrence of Jungle Cats, it appears that the sites of Nagda and Nagarjunkonda were well forested with deceduous trees. The presence of Fox and Caracal indicate that the site of Harappa had scrub jungles rather than forest. But as none of the material from Harappa, Nagda and Nagarjunkonda appears to be of Domestic Cat, it is assumed that either the domesticated cats were not introduced to the areas by that time or the Jungle Cat or its subspecies were the native ancestral forms from which the present day Indian Domestic Cats have sprung.

Acknowledgement

The author is indebted to Dr. B. K. Tikader, Director, Zoological Survey of India, Calcutta, for the facilities to carry out the work. He is also thankful to Dr. P. K. Das, Mr. M. K. Ghosh and Mr. T. P. Bhattacharjee for their helps in different ways. He is also obliged to Dr. R. K. Ghose, Zoologist, for necessary suggestion.

TABLE 1

The comparative measurements of the humerus (in mm.) of Fox (*Vulpes bengalensis* Shaw) **from Harappa with present day specimens in the collection of ZSI.**

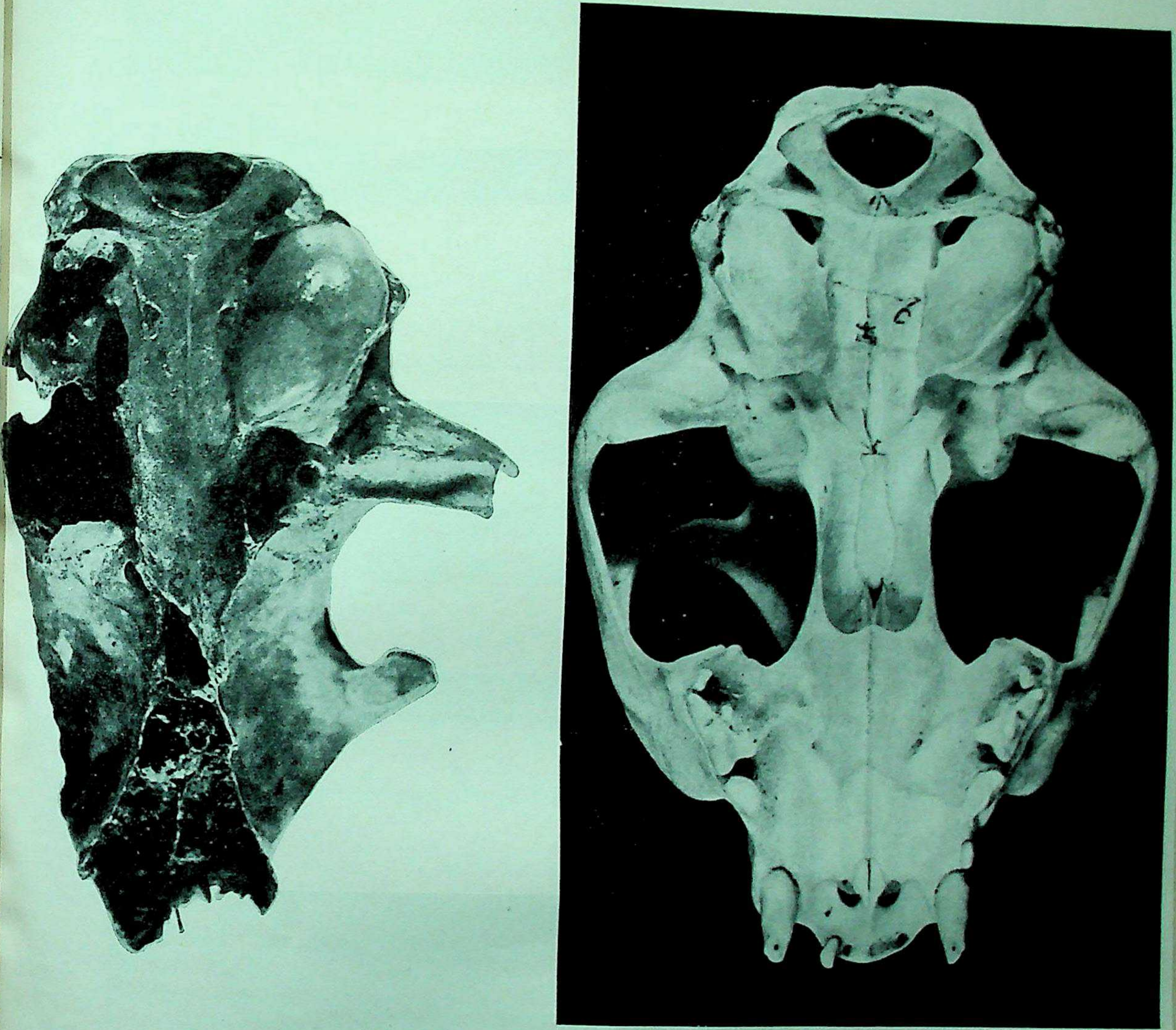
Item: Humerus	Specimens from Harappa No. 7851a	♂ Specimen present in the collection of ZSI. Orissa, 1946 colln.	♀ Specimen present in the collection of ZSI. Reg. No. 7239
Greatest length	97·80	100·00	91·00
Proximal width	21·00	20·00	20·00
Distal width	15·60	16·50	15·00
Medial width	7·20	7·50	7·40

TABLE 2

Comparative measurements of the skull (in mm.) of Caracal (*Felis caracal* Schreiber) **from Harappa with the present day specimen & domesticated cat**

Item: Skull	Specimen from Harappa No. 7851a	♂ Adult specimen of Caracal present in ZSI. Rg. No. 7140	Present day Domestic Cat in ZSI.
Frontal length	38·00	41·00	30·50
Gap between the Paramastoid process	50·00	54·00	41·30
Width of Bulla	13·00	15·00	10·40
Height of Bulla	15·00	17·00	11·40

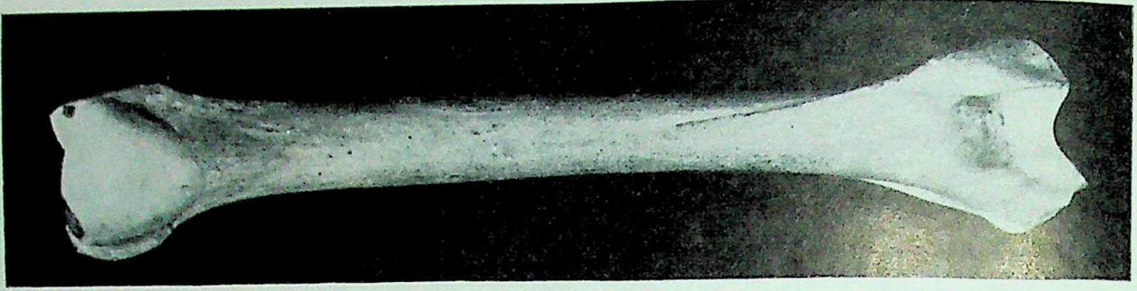
PLATE 1



A

B

PLATE 2



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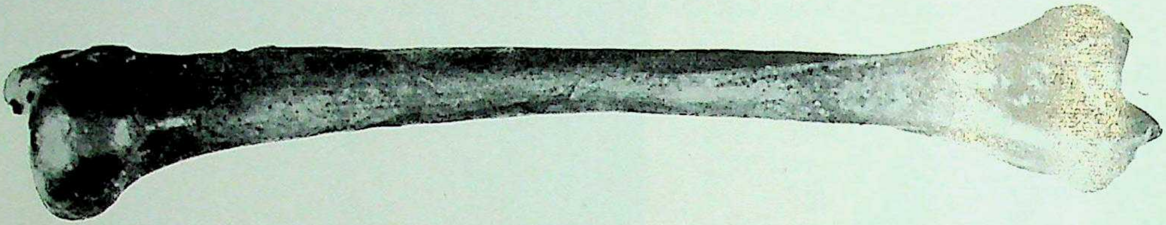

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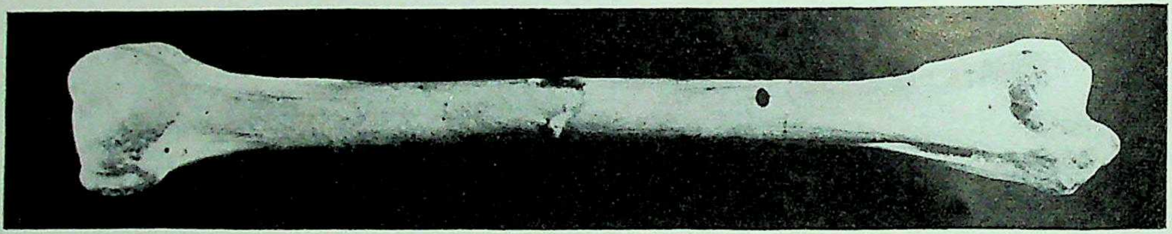

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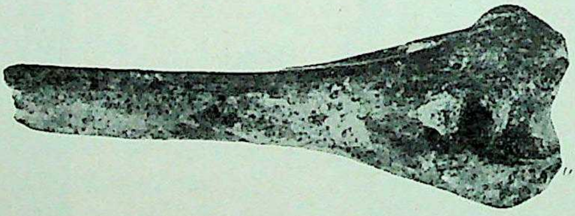

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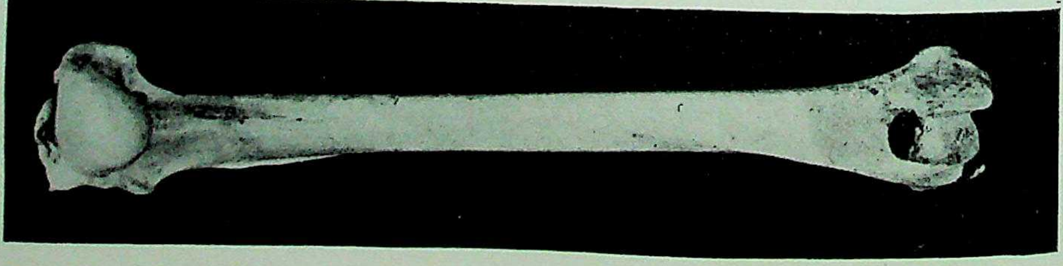

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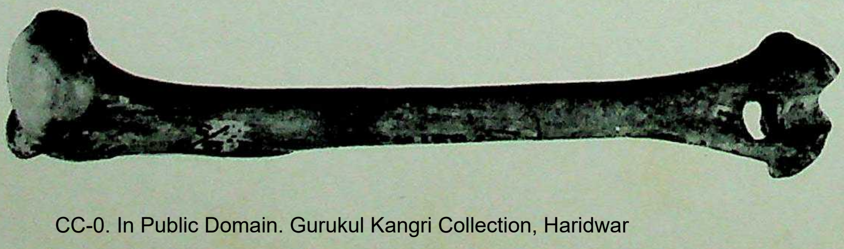

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TABLE 3

Comparative measurements of the humerus (in mm.) from Nagda and Nagarjunkonda with present day specimen of Jungle Cat (*Felis chaus* Guldenstaedt) **& domesticated cat present in ZSI.**

Item: Humerus	Specimen from Nagda	Specimen from Nagarjunkonda	Specimen of Jungle Cat from Orissa	♂ Specimen of Jungle Cat present in Ind. Mus.	Specimen of Domestic Cat
Total length	116·50	53+	122·00	124·00	99·00
Length of shaft	86·50		90·00	93·00	69·00
Proximal condyle	24·00		24·30	26·00	22·20
Medial width	9·30	8·40	10·00	10·50	9·50
Distal condyle	18·50	18·80	20·00	21·00	19·00

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EXPLANATION OF PLATES

PLATE-1. A—The skull of Caracal, *Felis caracal* Schreiber from Harappa.
B—That of a domesticated cat in Z.S.I.

PLATE-2. C—The Lt. humerus of Fox, *Vulpes bengalensis* Shaw from Harappa.
D—That of a present day specimen in Z.S.I.
E—The Lt. humerus (broken) of Jungle Cat, *Felis chaus* Guldenstaedt from Nagarjunakonda.
F—That of the complete Rt. side from Nagda.
G—The humerus of a present day specimen of same species of Jungle Cat.
H—The Rt. humerus of one adult domesticated cat in Z.S.I.

TWO VIṢṆU SCULPTURES OF PURULIA

ATUL CHANDRA BHOWMICK

1. Viṣṇu from Suisa (131.5 cms. x 63.0 cms.)

THE Directorate of Archaeology, West Bengal has a protected sculpture shed at Suisa, south-west of Purulia town and 6 kms. south of Baghmundi hill. An image of fourhanded Viṣṇu (Fig. 1) finds its place in the shed where Jaina icons are the main objects of collections.

The Viṣṇu is carved in hard chlorite-biotite schist[1] and stands on a raised *padmāsana* in *tribhaṅga* pose holding the prescribed attributes in his four hands. The *pañcaratha* pedestal shows lotus petals curling out in two rows. The lower right hand of the deity holds a lotus bud symbolical of the ever-renewing creation, the upper right, a *cakra*, symbolical of eternal time, the upper left, a *gadā*, symbolical of eternal law and the unfailing punishment for breach of law and the lower left, a *śaṁkha*, symbolical of eternal space. The manner of disposition of the emblems held by the hands is slightly different from the usual order: Clockwise, *śaṁkha, cakra, gadā, padma*. This peculiarity recorded here gives the image a unique and interesting position. According to the *Rūpamaṇḍana* text, this form represents the *Śrīdhara* variety of Viṣṇu[2]. The disc held by the god has fine spokes and indicates a slow motion. The mace looks like a round top-heavy rod with channelling marks on it. The two upper hands are turned upwards at elbows thereby lifting the attributes above the shoulders. Top palm of the lower right is elegantly disposed in *varada-mudrā* and the thumb is bent as if it clips the lotus stalk. The lower left hand holding the conch is in vertical position near its narrower end and rests on a stalked lotus base. The conch is represented as an actual conch, not looking much like the earlier form of a ambrosia flask (*amṛtaghaṭa*)[3].

The image of Viṣṇu is found adorned with a *upavīta* (the sacred thread) and *vanamālā*. He is bejewelled profusely with *candrahāra* of *Kaustubha* gem, a pair of ear *ratna-kuṇḍala*, a pair each of *keyūra* (armlet) and *valaya* (bracelet), a pair of *nupura*, a *kaṭibandha* (girdle) and a highly beaded *kirīta-mukuṭa*. The clinging drapery (*paridhāna*) of the deity comes down to his knees and is tied tightly around the waist with a scarf as girdle. A border lavishly carved with a foliated creeper encircles the head of god. The image is carved in high relievo that renders the effect of three dimensional volume of the rendering. The left foot below the knee, at the middle has a raised band. Probably the sculptor showed it for strengthening a weak portion of sculpted stone. The stele is crowned with a flattish and broad *āmalakaśilā* symbolising a temple. Down below there are seated lions on both sides indicating *siṁhāsana;* above there are twin *vidyādharas* flying through clouds and elephants with centaur and *makara* gargoyal on either side of the crown of the god. The *vidyādharas* hold garlands in their hands and the *vidyādharīs* are shown as if praying with folded hands. The celes-

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[1] The stone was identified by Dr. Asok Kumar Bhattacharya, Lecturer, Department of Geology, Jogamaya Devi College, Calcutta.

[2] Bhattasali, N. K., *Iconography of Buddhist and Brahmanical Sculptures in the Dacca Museum* (Varanasi, 1972), p. 82.

[3] Desai, S. Kalpana, *Iconography of Vishnu*, (New Delhi, 1973), p. 3.

PLATE I

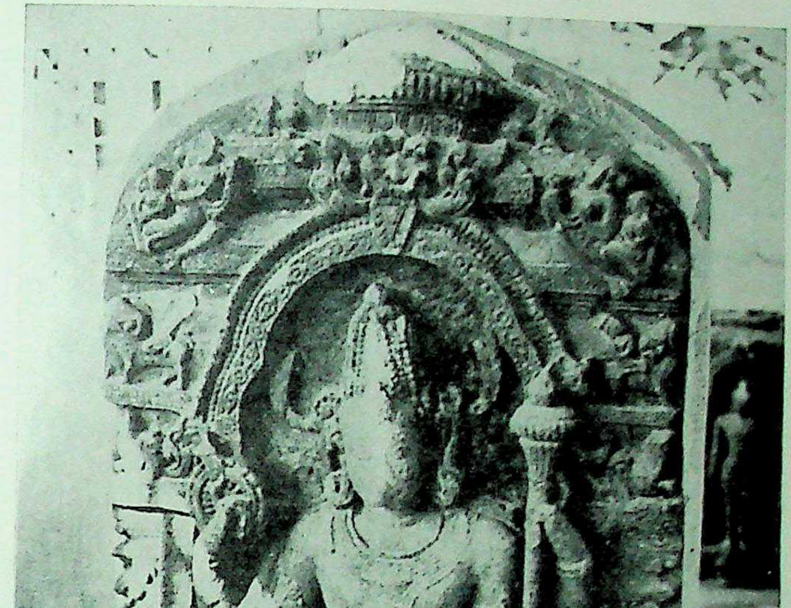

Fig. 1
Suisa Viṣṇu, *c.* 10th A.D.

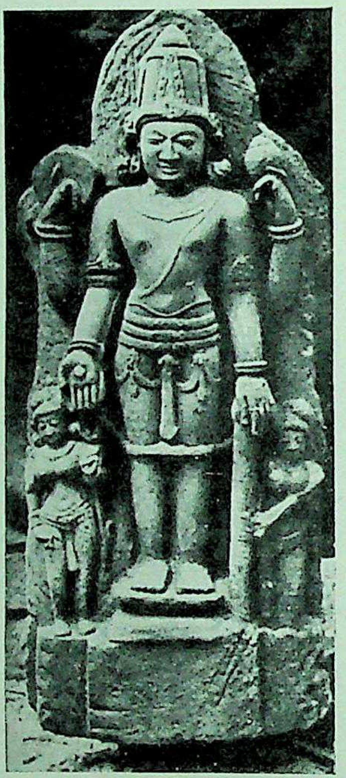

Fig. 2
Gurudih Viṣṇu, *c.* 9th A.D. (Courtesy: Directorate of Archaeology, Govt. of West Bengal).

tials appear as if conveying their adoration to the god. A *kīrti-mukha* (*rāhu-mukha*) is displayed at the top of the crest of his crown. The back slab has on its two edges a chain of succession of animals fashioned vertically from lower to upper as under: squatting burly elephant with rider on a lotus surmounted by a rampant *śārdula* (*gajaśārdula*). On two sides the god is flanked by his consorts—Lakṣmī, the goddess of beauty and wealth and Sarasvatī, the goddess of all knowledge and culture on right and left sides respectively, both suggesting restrained volume and modelling in the round. The female divinities are shown standing on lotuses each in a graceful *tribhaṅga* pose. Goddess Lakṣmī holds a *cāmara* (fly-whisk), made of the tail-hair of a yak, by her right hand while Sarasvatī holds a *vīṇā*, creating a sense of balance. Their young bodies are bedecked with ornaments and appear replete with feminine grace. The pious donor couple are shown in kneeling posture with *añjali-mudrā* separately on two sides below Lakṣmī and Sarasvatī respectively. On the pedestal, directly below the feet of the god is a flower motif shown blooming with curly petals obviously depicted as a divine offering. On stylistic grounds and in view of the iconography and the conventional motifs this image of Viṣṇu may well be assigned to the later part of 10th century A. D.

2. Viṣṇu from Gurudih (115.0 cms. x 50.0 cms.)

Temple (*devakula*) of Kamaleśvara was constructed with stones taken by the local villagers from the debris of Telkupi temples in Gurudih village, under Raghunathpur Police Station of the Purulia district of West Bengal. In this temple there is an image of Viṣṇu (Fig. 2) along with *liṅgas* have been installed by tenoh. The endeavour of the villagers in the installation of those gods speaks highly of their religious enthusiasm. The place under consideration is situated towards north-east of Purulia town at a distance of about 32 kms.

The image of Viṣṇu is carved in a chlorite-biotite schist in bold relief. The corpulent Viṣṇu stands placidly over a raised double petalled lotus pisths in *samapadasthānaka* pose. He has four hands holding, clockwise, a lotusmark (*padma*) on the palm of the hand which displays *varada-mudrā* (gift-bestowing gesture), a *cakra*, a *saṁkha*, and a *gadā*, placed vertically. The order of the weapons held by the left hands is just reverse of the Suisa image of Viṣṇu. The image according to the *Rupamaṇḍana* is a variety of Tanārdana Viṣṇu and Vāsudeva, according to the *Padma-Purāṇa* (Desai:1973:151). The Viṣṇu figure is decked with a *upavita* (sacred thread) across the chest and shoulder, *vaijayantī-mālā*, a plain necklace of precious gem *ratna-kuṇḍalas* with lotus ends, a finger-ring in right index finger, *keyūra*, two strands of thick bangles on each hand, three stringed *kaṭibandhas* (girdles) with beads and a high *kirīṭa-mukuṭa* crowned by a conical object. He is clothed in a short *dhotī* fastened by the girdle. Over the *dhotī* around the waist dangles the loops of the *Kaṭibandha*. The halo has a trefoil arch. On the proper right side of the figure of Viṣṇu is placed the dexter figure of Lakṣmī standing gracefully, holding the stalk of a full-bloomed lotus in her left hand and right hand touching her right thigh. The corresponding figure on the other side is that of Sarasvatī holding a *vīṇā*. Both the attending goddess as are shown decked elegantly with *hāra*, bangles and beaded *katibandhas* and both stand in *dvibhaṅga* pose. The back slab is, however, devoid of any figured decoration. The Viṣṇu and his attending figures are placed on a plain *triratha* pedestal. Shri Maniram Mahato, an inhabitant of the village informed that every year during *Chaitra-Saṅkrānti* (last day of Chaitra) (March-April) an annual fair, called *vāruṇī melā* is held at this place and the Hindus worship the venerated god for the furtherance of their spiritual progress and fulfilment of their respective desires.

The simplicity of the design, the character of the *āyudhas* and the pedestal, the absence of elaboration in ornamentation—all lead to the conclusion that it is an old piece of sculpture. At present the Viṣṇu is greatly defaced due to weather, transportation and lying in neglect. But J. D. Beglar[4], when he had noticed this image of Viṣṇu had remarked it to be Viṣṇu a "finely executed statue"[5]. From the general crudity and robustness of the image and its vigorously modelled roundish face the image can safely be assigned to *c.* 9th century A.D.

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[4] See, J. D. Beglar, Report of a Tour through the Bengal Provinces in 1872-73, *Archaeological Survey of India. Report*, Vol. VIII, Calcutta, 1873.

[5] Mitra, Debala, Telkupi—submerged temple site in West Bengal, *Memoirs of the Archaeological Survey of India*, No. 76, Delhi, 1969. pl. XXXV, Fig. A.

These two Viṣṇu images discussed herein represent some distinctive peculiarities which are conspicuously absent in the sculptures found in northern Bengal. The supple and pliable body delineated with consummate skill of the sculptors of the Pāla school of art are lacking in these sculptures which may form a distinct group[6] of early mediaeval art.

The sculptures visualise a trend which has some collateral affinity, and definitely reveal a distinct pulsating rhythm of their own, having some similarity to the art forms of Khiching in Utkala[7] under the rule of the Bhanja Kings. The suavity, massiveness, crudity and life-like presentation, yet forceful in spirit are all distinctive features of Purulia sculpture and isolate the school from the ambit of classical Pāla-Sena art of Bengal. The smooth and gliding linear rhythm are altogether lacking, while the undulating form has acquired some metallic crispness (Fig. 2) though still tense with an inner life upsurging the emotional feeling. The flabby and distended modelling of the figures of the reveals a self-controlled and balanced disposition and adds a particular charm to the images.

These sculptures which once flourished in Purulia was a product created by the fusion of the art idioms of neighbouring areas of Chhotanagpur and Orissa and lay within an art crucible from which came out this sensuous school of Manbhum, a regional school of art of certain import and significance, guided by powerful local ateliers who were not imbued with the ideas and ideologies of the plastic Pāla art expression. The modelling appears to be softened by the dexterous hands of artists. These sculptures of Rāḍha region are imbued with great strength and vigour and exude an aura of vitality. The Purulia sculptures were ignorant of the perfected Pāla art forms. However, once the Purulia sculptors made a start, they achieved a fluency in handling their material, made striking advances in style and technique, and rediscovered perfection in their own way.

(The author expresses his thanks to Shri Pratip Kumar Mitra, Registering Officer, Directorate of Archaeology, Government of West Bengal, Western Circle, Burdwan, for his help.)

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[6] See, Paresh Chandra Dasgupta, 'Pashaner Phul' (in Bengali), *Sraman*, Vol. VII, No. 2, Calcutta 1386 B.E., p. 37.
[7] Paresh Chandra Dasgupta, *loc. cit.*, p. 38.

COMMERCE AND MONEY IN THE WESTERN AND CENTRAL SECTORS OF EASTERN INDIA

(*c.* A.D. 750-1200)

B. N. MUKHERJEE

A

The expression "Western and Central Sectors of Eastern India" may geo-politically denote the territory of the Indian subcontinent now included in Bihar, West Bengal and Bangladesh, which are situated between the south-eastern state like Orissa, the central Indian state called Madhya Pradesh, a northern state like U. P. and the extreme eastern states including Assam, Meghalaya and Mizoram. During the period ranging from c. A.D. 750 to 1200, the major portion of it was politically controlled first by the Pālas, then partly by them and partly by the Senas and finally by the latter.[1] No doubt, certain areas of this territory witnessed the rule of some other powers as well as that of the Pālas and Senas. Thus Harikela (including Samataṭa), comprising South-Eastern Bangladesh (to the east of the Meghna river) and parts of Tripura,[2] was at different times under the Devas, Pālas, Kambojas, Chandras, Pālas (of Kāmarūpa) (?), dynasty of Aniruddha and Kyanzittha of Pagan (Burma) and the Senas (?).[3] Vaṅga (in the mid-eastern section of Bangladesh lying to the west of the Meghna) was dominated for some time in the later Pāla period by the Chandras and then by the Varmans.[4] Rāḍha (now included in West Bengal) was ruled at least for some time during the Pāla period by some minor powers.[5] The same may be said of certain areas of South Bihar in the Pāla-Sena age.[6] North Bihar was dominated by the Pālas, family of Nānyadeva and the Senas.[7] The Pāla and Sena empires also witnessed invasions by outside powers and sometimes temporary loss of territories.[8] In sipte of all these facts and the crisis created by the rise of a Kaivarta chief against the Pālas,[9] the zone under review was broadly under the hegemony of the Pālas and the Senas during the period concerned. The vast territory or the most of it was on the whole politically stable during the major part of about four hundred fifty years.

The political stability for a long time would have encouraged growth of industry and regular movement of articles of commerce. Apart from overland routes, the Ganges and its branches provided very convenient channels of communication.[9a] The sea-coast of the territory under review enhanced its potentiality as a base for maritime trade.

B

Commercial activities in the zone and period concerned are suggested by references in different contemporary sources to its various agricultural and other economic products which became known to the writers concerned obviously on account of their quality and/or productions in marketable quantity. Magadha (in South Bihar) became known for its richness in rice.[10] While the *Rāmacharita* of Sandhyākaranandī mentions paddy plants of various kinds,[11] the Anulia copper-plate inscription of Lakshmaṇasena refers to "myriads of excellent villages, consisting of land growing paddy excessively".[12] Fruits, orchards and plantations of commercial value are mentioned in epigraphs.[12a] The *Rāmacharita* refers to sugar-cane plants in Varendrī.[12b] The *Kāvyamīmāṁsā* speaks elloquently of the excellence of sugar-cane of Puṇḍra[13] (which included Varendrī and a territory now in the northern sections of West Bengal and Bangladesh). The *Rāmacharita* refers to the availability in Varendrī of such items of commercial importance as *ela* (cardamom) plant, musk, black aloes, sandal, saffron, camphor, garments of fine texture, diamond, lapis lazuli, pearl, emarald, ruby and saphire.[13a] While a few of these (including the first) might have been produced in Varendrī, others were apparently imported there.[13b]

Specialised industries of the region are indicated by certain literary and archaeological materials. Vaṅga and Aṅga (Monghyr and Bhagalpur regions) were famous for manufacturing swords of distinctive quality.[14] The former was also well-known for its tin industry.[15] It appears from indigenous sources (literary as well as archaeological) that weaving, leather and metal works of various kinds, pottery, jewellery, sculpting, masonry and structure building were among other crafts and industries.[16]

Further information on trade and industry of this region is furnished by early Muslim geographers. It has been recognised that the kingdom mentioned by them as Ruhmī, R.hmī, Rahmī, Rahma, D.hmī and Dahum can be identified as the Pāla empire, especially of the time of Dharmapāla.[17] Sulaiman, the merchant, observed that "there is a stuff made in this country (Ruhmī) which is not be found elsewhere, so fine and delicate is this material that a dress made of it passed through a signet-ring. It is made of cotton, and we have seen a piece of it. Trade is carried on by means of kauris, which are the current money of the country. They have gold and silver in the country, aloes, and the staff called *samara*"[18] (i.e. *chāmara* or chowrie). According to Ibn Khurdādba, the sixth king "is R.hmī (Rahmī), and between him and other kings a communication is kept by ships [or between whose (possessions) and (those of) the others there is a distance of one year.] This country produces cotton clothes and aloes-wood".[19] Ya'qūbī considered Rum as a vast country situated on the sea and producing gold.[20] Al Mas'ūdī noted that the inhabitants of the powerful kingdom of Rahma's (or R.hmay's) possessions, comprising a territory stretching up to the sea, "have elephants, camels and horses".[21] It is stated in the *Ḥudūd al-'Ālam* that "in no place of Hindūstān are fresh aloes found as in the (possessions) of the king of Kāmarūn and of Dahum. These countries produce in large quantities good cotton which (grows) on trees yielding their porduce during many years. The product of this country is the white conch, which is blown like a trumpet and is called **shank*. In this country there are numerous elephants".[22]

However, horses of the Pāla cavalry[23] must have been largely imported from outside. It appears from the *Tabaqāti-Nasīrī* that foreign merchants used to bring horses for sale at Nudīah during the reign of Lakhmaṇīah or Lakshmaṇasena.[24] About fifteen hundred horses were daily sold at Karambatan or Karampattan or Kar-pattan (somewhere at the foot of the Eastern Himalayas), from where these animals were brought to the territory of Lakhaṇawṭī (under Lakshmaṇasena).[25]

Trading activities in the region in question continued in the 13th century and so immediately after our period. "Fine swords, tou-lo cotton stuffs and common cotton cloth" are described as products of P'ong-k'ie-lo i.e. Vaṅgāla (on the sea-coast and to the south of Vaṅga region or a part of the southern section of that area) in the *Chu-fan-chi* of Chau ju-kua, written about the middle of the 13th century A.D.[26] Marco Polo observed that in Bengala "they grow cotton in which they derive a great trade, also spices like spikenard, galingale, ginger, sugar and many other sorts".[27]

Some of the above noted articles fetched high price outisde the region concerned. Thus finest quality of aloes-wood (of Kumār=Kāmarūpa, which must have been exported through the port of Samandar located in the area concerned)[28] was worth 200 dinars per *man* (in Multan ?)[29]. Girdles made out of horn of rhinoceros, exported from Rahma to China, used to fetch 2,000 to 4,000 dinars each.[30]

It appears that during the Pāla-Sena period the area concerned saw trading in local products and imported items of commerce and also exportation of valuable articles, produced locally or brought from interior territories.[31] Volume of trade might have increased in the later phase of the period in question, but it was not absent from the region during the earlier phase. Local shops (*haṭṭīya-griha*), markets (*haṭṭa*) and big-markets (*haṭṭavara*) have been referred to in inscriptions.[32] Inscriptions and literature allude to the wealth enjoyed by the ruling class[23] and the people favoured by it.[34] At least a part of the wealth could have been acquired through taxation on and participation in trade.

C

Inscriptions do refer to restrictions and taxes imposed by governments on trading articles. The Khalimpur inscription of Dharmapāla says that his praises were sung by, among others, measure-inspectors in every selling house or shop (*pratyāpaṇaṁmānapaiḥ*).[35] The same record mentions *haṭṭikā*, i.e. "petty market" or "market-dues".[36] Royal officers in charge of collecting dues from markets, customs and ferries were known as haṭṭapati, śaulkika and tarika respectively.[37] Śrī-Dhamra (i.e. Dharma) haṭṭa of Nālandā and Devapāladeva-haṭṭa of Nālandā, mentioned in image inscriptions as the localities where the icons concerned were dedicated, might have been market places including shrines, housing the patron deities of the traders.[38] The association of the names of two Pāla kings with such market places may suggest them as their founders or owners or at least indicate the existence of these markets under the Pāla patronage.

The royal interest in trade is suggested also by other data. The *Ḥudūd al-'Ālam* refers to aloes (wood) in a manner which indicates that trading in it was somewhat controlled by the king of Kāmarūpa and Dahum, i.e. Dharmapāla.[39] One of the towns (ports) controlled by the latter was S(a) m(a)nd(a)r.[40] It was probably located in the area of Chittagong (of ancient Harikela and modern Bangladesh).[41] It rose into prominence as an international port having maritime connection with South India, Ceylon, West Asia and South-East Asia, perhaps after the decline of Tamralipti (modern Tamluk in the Midnapore district of West Bengal) by sometime in or before the early Pāla age.[42] Early Pāla rule in Samataṭa (Comilla and Noakhali areas) is attested by the Sian inscription[43] and hence the extension of the authority of the early Pālas to the nearby Chittagong region was quite feasible.[44] The international trade of the Pāla empire could have been routed through this port even after effective control over it was lost by the Pālas due to the rise of the Chandras and other factors.[45] It would have been profitable for the authorities in control of the vital coastal area to promote this international trade, as it was done later by a sultan of Bengal (Alauddin Hussain Shah) (1493-1519) when he allowed the merchandise of the rebel kingdom of Tripurā to pass through the port city of Bengala = Samandar = Chittagong.[46] Al Idrīsī in the 11th-12th century spoke of Samandar (= Chittagong) as "a large town, commercial and rich, where there are good profits to be made".[47] Al Idrīsī also indicated that it had a big hinterland.[48] He also stated that "one day's sail from this city there is a large island well peopled and frequented by merchants of all countries".[48a] This island is identifiable with that called Sandwip situated not far from Chittagong.

Such type of brisk trade would have made merchants or at least many of them quite rich. A story in the *Ballālacharita* of Ānandabhaṭṭa speaks of king Vallālasena asking for a loan of a huge amount from a merchant and of imposition of harsh taxes by him on merchants.[49]

Thus the territory concerned (i.e. the western and central sectors of Eastern India) witnessed brisk internal trade, transit trade and international trade during the time of *inter alios* the early Pālas, later Pālas and Senas. (The trend continued even in the later centuries.[50]). The ruling authorities were apparently interested in promoting the trade.[50a]

D

Such a volume of trade over a vast territory could not have been transacted conveniently by barter only. There must have been one or more than one medium of exchange. Sulaiman clearly stated in about the middle of the ninth century A.D. that in the kingdom of Ruhmī (i.e. the Pāla empire) (see n. 17) "trade is carried on by means by kauris, which are the current money of the country".[51] According to the *Rāmacharita*, written in the 12th century A.D., Madanapāla maintained his large army "by cowries (as wages) and daily bread" (*kapardda-karoṭī-bhṛitaṁ mahā-vāhinīm*).[52] Minhāj-ud-din Abū-Umar observed in the 13th century A.D. about the kingdom of Rae Lakhmaṇīah (Lakshmaṇasena) that "as in that country the kauri (shell) is the current money in place of silver, the least gift he used to bestow was a lac of kauris."[53] Ibn Batūta, who visited Sudkāwān (i.e. Chaṭṭagrāma) of Bangāla (Vaṅgāla) not long after the end of the rule of the family of Daśarathadeva in that area,[54] noted the rates of local commodities in terms of dirham, but very clearly stated that people of Bangāla, who acquired from the Maldivi islands cowrie shells in exchange of rice, used "them as money".[55] Ma-huan, who came in c. A.D. 1405 to Pang-ko-la (Vaṅgāla in a greater sense, meaning in this context the teritory of the Sultan Ghiyās-ud-din A'zam Shāh of Bengal) observed that "the currency of the country is a silver coin called *tang-ka* (*ṭaṅka*).... All large business transactions are carried on with this coin, but for small purchases they use a sea-shell called by foreigners kao-li (cowrie)".[56]

It appears from the above quoted sources that in the zone under review during the rule of *inter alios* the Pālas and the Senas the main medium of exchange was formed by cowries (kapardakas) imported in large number.[57] The cowries, discovered in a hoard in the ruins of a monument of the Pāla period at Paharpur (Rajshahi district) and also at the Pāla site at Colgong (Bhagalpur region)[58] are clear archaeological testimonies to the use of kapardakas in the Pāla empire. The familiarity of the subjects of the Senas with cowries is indicated by a comparison of pearls with big cowries (*sthūla-varāṭikas*) in the Deopara inscription of Vijayasena.[59] The cowries continued to be a part of the currency even after the Muslims had instituted a regular silver coinage in the territory concerned.[60]

Simultaneous use of cowries and coins were not unknown also in ancient India. Fa-hsien observed the use of cowries "in buying and selling commodities" in Middle Kingdom (Madhyadeśa)[61] at a time when it was at least partly in the Gupta empire and must have been familiar with the Gupta coinage. The feasibility of the simultaneous use of cowries and coins in the period under review (c. A.D. 750-1200) is indicated by the discovery at Bhondri (Lucknow district) of a hoard comprising 54 silver coins bearing the name of the Pratīhāra king Vināyakapāla (first half of the 10th century A.D.) and 9834 cowries.[62]

It is noteworthy that coin names do appear in the records of the Pālas and Senas whose dominions were familiar with kapardakas or cowries. The Bodhgaya stone inscription of the regnal year 26 of Dharmapāla refers to the excavation of a tank at the cost of three thousand drammas.[63] The Bhaturiya epigraph of Rājyapāla (c. A.D. 917-952) mentions the concessional (*nikara*) tax on a village fixed at one hundred purāṇas (per annum).[64] The Gaya record of Govindapāla, dated 1232 V.S. (A.D. 1174-75), speaks of the creation of an endowment of 50 kārshāpaṇas yielding annually 16 kārshāpaṇas (i.e. an interest of 32% per year). An inscribed line in the left margin along the border of this inscription refers to the payment of "these kapardakas" in front of the image of a deity and in the presence of two witnesses.[65] Obviously the money endowed, calculated in terms of kārshāpaṇa, was paid in equivalent number of kapardakas.[66] According to the figures given in a quotation in Utpala's commentary (10th century A.D.) on Varāhamihira's *Bṛihat-saṁhitā* (79, 12-13), 1280 cowrie-shells (*śvetika*) were equal in value to one purāṇa, also called kārshāpaṇa.[67] So the endowment concerned consisted of (50×1280) 64,000 of kapardakas or cowrie-shells.[68]

This evidence clearly supports the theory that the term *kapardaka-purāṇa*, appearing in some records of the Senas [like the Barrackpur plate of Vallālasena (c. A.D. 1159-79), the Anulia and Tarpandighi grants of Lakshmaṇasena (c. A.D. 1179-1206) and contemporary or nearly contemporary dynasties][69] denoted a theoretical unit of account representing the value of a purāṇa, counted in kapardakas or cowrie-shells.[70] The system of assessing the value of and income from land in terms of this currency unit became so common and easily intelligible that while writing several records it was not specifically mentioned (and so was thought unnecessary to be mentioned) along with the figures of value or income.[71]

It is difficult to determine the exact date of introduction of the use of the name *purāṇa* as a unit of calculation. We are not sure whether the purāṇas, mentioned in an inscription of Rājyapāla, or the drammas, referred to in a record of Dharmapāla, were actual coins.[72] In any case, these can never be taken as issues of the Pāla kings, none of whom can be considered to have struck coins bearing their names.[73] However, these drammas and purāṇas, which might have been equal to one another in theoretical value,[74] could have denoted coins brought into the Pāla empire from outside.

We can refer in this connection to the debased silver coins, based on Indo-Sasanian "bust" and "altar with attendants" devices and bearing the legend *śrīvigra*.[75] Some coins of this class have been found at a few sites (like Paharpur in the Rajshahi district of Bangladesh and Ghosrawa, Buxar, Hajipur and a locality of the Purnea district of Bihar)[76] included in the territory under review. However, coins of this class, which betray a gradual degradation in style, are basically related to the above noted Sasanian or Indo-Sasanian coin-types minted in regions much to the west of Bihar. Moreover, the reverse of these coins are stylistically to some extent related to the Ādivarāha coins, which were introduced by the Pratīhāra king Bhoja I. These two classes of coins have in many cases been found in the same hoard.[77] The Śrī-Vigra coins have been unearthed in great number in different places of U.P.[78] Siyadoni (Lalitpur district of U.P.), which has yielded an inscription referring to the rule of the Pratīhāras and containing different dates from V.S. 960 to 1025 (i.e. A.D. 902-3 to 967-68), could have been within the regular area of circulation of the coins in question if these are considered to have been mentioned in that record as Vigraha-dramma, Vigrahapāla-dramma Vigrahatuṅgiya-dramma and Vigrahapālīya-dramma.[79] Hence Śrī-Vigra coins should have come into circulation in the U.P. region before the 10th century A.D. The initial date of circulation can be placed much earlier if we remember that from the points of view of average weight, pure silver content and stylistic features these are nearer to Indo-Sasanian prototypes than the issues of the Ādivarāha series, initiated by Bhoja I (c. A.D. 836-885).[80]

The territory under review does not appear to have been a regular area of circulation of Śrī-Vigra dramma, though a number of them might have been brought there by way of commerce.[81] Moreover, since the silver content of coins of this class is known to have been very poor (about 48·15 percent or less than half of the total amount of metal content in a piece having an average weight of about 3·78 gm.),[82] these could not have passed for long as drammas or purāṇas of high intrinsic value. So even if they were accepted for some time, they would not be counted in the long run as equivalent to a purāṇa or dharaṇa of (16×2=) 32 krishṇalas or ratis (or about 57·6 grains or 3·729 gm.).[83] Their poor silver content would have converted them as pieces of much lower value.

Thus outside coins (including coins of Śrī-Vigra) might not have formed a regular currency in the Pāla empire, or at best might have been used only in its initial period, though occasionally these could have found their way there, during the Pāla rule, in small number as drifts, mementoes, or remnants of transactions, involving *inter alios* people from the areas of the regular use of the relevant coins. And since the recorded number of finds of such outside coins of the period concerned in the territory of the Pāla empire is not great,[84] regular coined money was either absent or short of requirement from the very initial stage of the empire. Even when such outside coins were available there might have been tendencies to accept them as devalued pieces (their intrinsic worth having been much lower than relatively pure silver purāṇa coins of 32 ratis).[85]

This paucity or absence of monetary unit of relatively high value was not ordinarily conducive to the growth of industry and commerce as was witnessed in the Pāla empire. No doubt, kapardakas might have been imported and stored (in the houses of big merchants, bankers and princes) in very large number[86] and comparatively big transactions could be done in kapardakas. But there would have been always the difficulty of transporting large quantity of cowries of low value for such transactions. In areas of bad and insecured communications the crisis should have been aggravated. Its harmful effect on commerce could have been mitigated by following the system of payment through bills of exchange,[87] particularly when predetermined princes were to be paid in distant localities. But this system would not help the itinerant traders and travellers and foreign merchants who wanted to buy commodities after taking decisions at the site of sale. For itinerant traders and foreign merchants carrying of large number of cowries would have been a heavy burden, particularly when they had to arrange for transport of commodities for sale (through *inter alia* barter) as well as that for those to be purchased. Such people would naturally have preferred for an easily portable form of money having high intrinsic value.

There are indications for such preferences. The Madanpada inscription of Viśvarūpasena (first half of the 13th century A.D.)speaks of a plot of land yielding an annual income of "hundred chūrṇīs together-with thirty-two purāṇas-132" (*sāṁ-dvātriṁśat-purāṇottara-chūrṇṇī-śataika*—132) and of another piece of land yielding an "annual" income of "six hundred chūrṇṇīs together twenty-seven purāṇas (*saptaviṁśati purāṇādhika-sāṁ-chūrṇṇī-shaṭ-śatik-otpattika*).[88] The Vaṅgīya Sāhitya Parishat record of the same king refers to an annual income of five hundred chūrṇṇās (chūrṇṇīs).[89] As pointed out by D. C. Sircar, in these epigraphs the term *churṇṇī* or *chūrṇṇī*, i.e. *chūrṇī*, apparently has the same meaning as the term *purāṇa*.[89a] This hypothesis is supported by the Mehar plate of Damodara deva of Śaka 1156 (A.D. 1234), which uses the terms *purāṇa* (11. 17-19) and *chūrṇṇī* (1. 35) probably in the same sense.[90] The position is made clear by the Alagum inscription of Anantavarman Choḍagaṅga (of c. A.D. 1141), which records a deposit expressed in words as *pañcha-purāṇ-ādhika-churṇṇī-śat-aika* and in figures as *pu* (ie. *purāṇa*) 105.[91] So churṇṇi and purāṇa were same as kārshāpaṇa, which was equal in value to 1280 cowries shells.[92] D. C. Sircar observes that "the explanation of *churṇṇī* in the Oriya lexicons as *Kāhaṇa-parimiti-kauḍi* would suggest that it was the same as kapardaka-purāṇa counted in cowrie-shells."[93]

We like to point out that the word *chūrṇī* can be related to the term *chūrṇa*, signifying *inter alia* "powder", and may be taken as the nominative singular of the stem *chūrṇin*, meaning "made or mixed up with anything powdered or pounded".[94] In that case, the term concerned should have primarily meant "dust money" in the context of denoting a unit of currency. As a synonym of silver *kārshāpaṇa* of 32 ratis, it should have denoted "a unit of silver in dust weighing 32 ratis" (or nearly so, if the "pure" kārshāpaṇa coin of silver metal contained a little amount of alloy for technical, if not for any other, reason). The unit was equal in value to 1280 cowries.

It appears that the name *chūrṇī* came into use in the territory concerned, which had already been acquainted with other names for silver coins, as a unit of silver in dust weighing about 32 ratis. Such a unit served the purpose of a portable unit of metallic currency of high value, equal in worth to 1280 cowries. The dust could have been carried in small bags.[95]

The use of silver dust as money in the empire of the Pratīhāras in about the middle of the ninth century A.D. was mentioned by Sulaiman. While referring to the territory of a king of Jurz or Gujra, i.e. Gurjara Pratīhāra empire, Sulaiman stated that "exchanges are carried on in his state in silver (and gold?) dust, and there are said to be mines of these metals".[96] The availability of gold and silver in the territory under review is suggested by the testimonies of Sulaiman, Ibn Khurdādba and others. Sulaiman noticed that in Ruhmī (i.e. the Pāla empire) "they have gold and silver".[97] Ibn Khurdādba observed that "there is plenty of gold in this country".[98] Lakshmaṇasena used, according to the *Tabaqāt-i-Nasīrī*, "golden and silver dishes".[99] Tome Pires noticed that in Bengala "they accept them *(big cowries)* for a large number of commodities as they would for gold".[100] Hence gold could also be used, according Pires, as a medium of exchange. Pires noticed that Arakan had "some silver" and that "a great deal of silver" was used to be imported in Bengala from Pegu[101] (Burma). Thus apart from indigenous sources of silver and gold, the territory concerned could import the precious metals.[102]

The use of gold as a medium of exchange in our zone and period is indicated by a Tibetan account. According to it, when Nag-tsho was sent in the second quarter of the 11th century A.D. to Vikramaśila monastery to request for Atīśa's visit to Tibet, he was given "seven ounces of gold", for personal expenses and also some additional quantities of that metal for various other purposes.[103] Putting "gold dust in a small bag" he presented it to Atīśa.[104] The Tibetan account also alludes to the use of cowries in the monastery and at Bodhgaya.[105]

In the light of this evidence, we can offer a sensible interpretation of the reference to "nine hundred hemas" (*hemaṁ nava śatāni*), occurring in an inscription from Silimpur (Bogra district). King Jayapāladeva of Kāmarūpa (of c. 12th century A.D.) wanted to give these to a Brāhmaṇa.[106] Here each hema ("gold") can be taken to denote a piece of gold[107] metal weighing 80 ratis, which was the standard weight of suvarṇa ("gold") coins.[108]

Thus the territory under discussion probably had units of metal (gold and silver) currency as well as kapardakas to facilitate buying and selling of commodities. 1280 cowries were equal in value to one unit of silver (in the form of dust or metallic piece and) weighing about 32 ratis. Following the table furnished in the *Līlāvatī*,[108a] we may presume that 16 such silver units (called dramma, purāṇa or chūrṇi) were equal in value to a piece of gold (called suvarṇa, hema, nishka, etc.), weighing about 80 ratis. Such a unit of gold (in the form of dust or metallic piece) was worth 20480 cowries. If debased coins from outside came into circulation in the territory concerned, each class of them would have its rate of exchange with cowries fixed according to their intrinsic worth.[109]

E

There is also evidence of the existence of silver coinage in an area within the territory and during the period concerned. The area in question was known as Harikela (which initially included the Chittagong district, and later, by the 9th-10th century A.D., the Noakhali and Comilla districts and, by then or a little later, also the Sylhet district). In c. 7th century A.D. Harikela had a class of silver coins bearing on the obverse the legend *Harikela* and a recumbent bull and on the reverse a tripartite symbol. These coins, intended to be round, are known in at least two denominations. The size of the pieces of the higher denomination varies from about 2·6 (2·8) cms. to 3·07 (3·5) cms. The weight of the coins of higher denomination fluctuates generally from 5 to 7·5 gms., while that of the lower denomination ranges from 1·5 gm. to about 1·8 gm. (?). If these two denominations represent the full and quarter units, then there could have been also coins representing the half unit (weighing about 3-4 gms.). Stylistically, typologically and metrologically these silver pieces must be related to the silver coins of the "Chandra" dynasty of Arakan. So this series of Harikela coinage was inspired by the coinage of Arakan. On the other hand, the class of specie in question influenced the silver coinage of Paṭṭikeḍa (Commilla area) and the coins of the "Ākara" family of Comilla in c. 8th century A.D.

This series (no. 1) of Harikela coins was succeeded by another series of silver specie, having thinner and larger flan. The weight of the second series is also less than that of the first series. These are known at least in two denominations. Most of these coins are struck on one side only with the obverse device. There are coins indicating stages of changes in the size and weight and gradual disappearance of the reverse type. In fact, the flan of the regular coins of the second series is too thin to be stamped clearly with devices on both the sides.

Palaeographic features of the legend *Harikela* on the coins of the second series suggest that it was in circulation from about the 8th or 9th to the 12th or 13th century A.D.

The size of the large majority of known specimens of higher denomination, belonging to the second series, varies from 4.8 (4·95) to 5·25 (5·35) cms. Their weight ranges generally from 2·3800 to about 3·3660 gms.[110]

It appears that the weight standard of the silver coinage of Harikela was changed at a time when the region (including the Chittagong district) was assuming importance in international trade. It is, therefore, interesting to note that the outward appearance of the flan of several of the second series of Harikela coins is comparable with that of the thin Abbasid coins, which are, however, struck on both sides. We can specifically refer to a gold coin, found in an excavation at Mainamati.[111] At least the general appearance of this piece, issued by Abu Ahmed Abdallah al Must'asim Billah (A.D. 1242-1258), has affinity to that of some of the second series of Harikela coins. As indicated above, the trade contact between this region and the Islamic world might have begun by sometime of the 8th century A.D.[112] A thin round silver coin of Abbasid Caliph Hārūn-ur-Rashid, dated A.H. 172 (=A.D. 788), has been unearthed at Paharpur.[113] Thus the Abbasid coins, imported into the area now in Bangladesh probably by way of trade, might have influenced the fabric of later coinage of Harikela (now in South-Eastern Bangladesh).

The weight (3·906 gms. or 60·3 grains) of Muhammadan dirhams of pre-reformed currency as well as that (2·97 gms. or 45·48 grains) of the reformed currency[114] may be compared with the average weight of the coins of the second series of Harikela specie. However, the average weight of the pieces in question is also (perhaps more favourably) comparable with traditional weight of silver kārshāpaṇas or purāṇas of 32 ratis. The evidence of the Mehar inscription of Dāmodaradeva of 1156 Ś.E.(=A.D. 1233-34 or 1234-35) indicates the familiarity of this region with the coin name *purāṇa* as a unit of calculation (see above).[115] The use of the name *purāṇa* as a unit of value could have been known in this area in an earlier age when it came under the authority of the Pālas and then of the Senas and so by about the time of the beginning of the use of the new import of the term *purāṇa* in other parts of the Pāla empire.

If a particular coin name was known and was popularly used for making calculations in Harikela, there should have been a tendency to relate the traditional weight and type indicated by it to the currency of that region. But since actual silver coins of purāṇa denomination were not in currency, the moneyers concerned were not in a position to follow the shape, size and types of such class of specie. They could have adopted only the traditional weight of silver purāṇas, which should have been known to them as a unit of value.

The moneyers, however, must have been familiar with the first series of Harikela coins. There is really no doubt that the basic device (bull) and legend (*Harikela*) of the specie were borrowed from the older series (no. 1) of Harikela coins. But in determining the size and thickness of the flan they might have been influenced by a class of imported coins.

Thus the second series of coins of Harikela (*i*) adopted device (sometimes the reverse, but mostly the obverse) and the legend of the first series, (*ii*) probably followed an indiginous (purāṇa) weight standard and (*iii*) perhaps might have felt the impact of the shape and size of a class of imported coins. Imported as well as indigenous silver could be used to mint these coins.[116] Trade and political situation were important factors in the continuity of silver coinage in Harikela.

Both the first and second series of Harikela coinage may have local varieties, bearing names of places which can be located within the limits of Harikela.[117] These names and also the name *Harikela* show that the coins concerned bear the name of a region or names of localities. So even if these were struck during our period by political authorities [like the Pālas, Chandras, Senas (?) and Devas], they did not care to insert their names in the coin-legends.[118] On the other hand, different local varieties of Harikela coinage may suggest that at least these could have been struck by local bankers or guilds,[119] if not by local authorities.

In any case, the high purity of metal in the silver coinage of the second series (consisting of regional and local varieties)[120] proves that it was always minted by well organised authorities with an intention to maintain the credibility of the coinage. The weight of the coins of higher denomination indicates that they could pass as purāṇas and could be exchanged with a unit of silver dust of equal weight or with 1280 cowries. In the international trade they could be exchanged with dirhams or at least could find acceptance as dependable bullion.[121] Trade ensured the continuity and purity of the coinage of Harikela and that too even at times when it was (at least partly) within the Pāla or Sena (?) empire, which otherwise did not have any coinage of its own.

F

It appears that the western and central sectors of Eastern India had in the period ranging from c. A.D. 750 to 1200 a very complex system of currency. Its base was sustained by kapardakas. There was no coined money in the major portion of the territory, though outside coins could have found their way to it by way of trade and could have been used according to their intrinsic worth. But the large transactions in commerce and in other fields could have been done regularly in *inter alia* units of silver and gold dust (the former weighing 32 ratis and the latter 80 ratis). The units of silver dust were exchangable with silver coins of Harikela. Here the silver coinage was sustained through a comparatively higher pressure of trade and so constant demand for a medium of exchange consisting *inter alia* of a great number of dependable and easily countable pieces of relatively high value. This area also probably had enough quantity of silver imported from outside.[122] Genuine copper coins do not appear to have been struck in the zone and period under review.

As the silver coinage of Harikela had different denominations, so also the units of calculation or value could have been known not only as purāṇa or kārshāpaṇa (of 32 ratis) but, like coins of the same names (weighing 32 ratis), could have submultiples like paṇa, kakāṇī, or vuṭṭikā (or buḍi) and gaṇḍā (=gaṇḍaka).[123] A gaṇḍā was worth 4 cowries, a kākāṇī 20 cowries, a paṇa 80 cowries and a kārshāpaṇa 1280 cowries.[124] The high antiquity of the familiarity of the territory under review with these submultiples is suggested by the occurrence of the word *gaṇḍakehi* (i.e. *gaṇḍakaiḥ*), meaning "with gaṇḍakas", in the Mahasthan inscription of the Maurya period.[125]

G

The above data on trade and money help us in determining the pattern of commerce in the western and central sectors of Eastern India. No doubt, epigraphic and literary sources indicate agriculture as one of the main bases of socio-economic life of the zone and period.[126] But for disposing of surplus agricultural products (including rice) trading activities at different levels were involved at local markets as well as at distant places and at points of export (see above).[126a] Similarly, different types of organisation were necessary for (*i*) running industries (including those for which the region was well-known), (*ii*) transporting items of trade, produced or primarily available outside or inside the region, to its different marts and also to emporia in other territories in the subcontinent, and (*iii*) carrying internal and external products to different ports for exporting to several countries (see section B and relevant notes). That there were such organisations and competent organisers is suggested by the varied articles of commerce known to have been available in the zone concerned (see section B and relevant notes) and also by references to different categories of men of commerce like *vaṇik* (merchant) and *sārtha* (*vāha*) (itinerarant trader) in epigraphs[127] and to rich merchants (and so also financiers) in literary sources dealing with the territory in or shortly after the period in question (see section C and relevant notes). We may also legitimately guess the existence of financiers, large-scale as well as small scale industrialists, agriculturists, traders (stationary or mobile) (beside industrial labourer, peasants, and petty shop-keepers and pedlars). Forced as well as paid labour could have been utilised for production.[127a] Unfortunately, we do not know the details of the infrastructure of commerce of the zone and period.[127b]

Well-known overland and riverine routes could have been used for transporting articles of commerce (see section A and nn. 9a and 42). For an example, we can refer to the statement of Al Idrīsī that aloes-wood was used to be brought to Samandar (Chittagong) from Kāmrūt (Kāmarūpa), "15 day's distance", "by a river",[128] identifiable with the Brahmaputra. Apparently the logs of wood were brought on boats down the river to its mouth and thence across the bay and along the coast to Samandar (Chittagong).

Maritime trade flourished throughout or during the major part of the period. We have evidence to this effect from *inter alios* Sulaiman (A.D. 851), Ibn Khurdādba (a part of the 9th century and early 10th century A.D.), author of the *Ḥudūd al-'Ālam* (A.D. 982) and Al Idrīsī (11th-12th century A.D.) (see section B). The continuation of this trade is reflected in the testimonies of Chau ju-kua (about the middle of the 13th century A.D.),[129] Ibn Batūta (A.D. 1325-54)[130] and Ma-huan (early 15th century A.D.)[131] (see section B and relevant notes).

The coastal area which regularly figured in this trade lay in the territory now in South-Eastern Bangladesh and not in West Bengal. Tamralipti (Tamluk in the Midnapore district of West Bengal) did not play any significant role in this trade. The most important port was Samandar (=Chittagong). Perhaps hydrographic changes,[132] probability of securing comparatively larger hinterland,[133] convenience of the international traders of the period[134] were among the reasons which favoured more maritime trade on the south-east than on the west or south-west coast of the region (see section B and n. 42).

As noted above, the items of commerce (especially the inorganic ones), attributed to Ruhmī by foreign writers should have been among the chief items of export from that territory, identifiable with the Pāla empire (see section B and relevant notes). That much of the export trade was conducted through Samandar (Chittagong) is indicated by Al Idrīsī, who noted that aloes-wood from Kāmrūt (Kāmarūpa) was used to be brought down to Samandar by a river, identifiable with the Brahmaputra, which was referred to as Samundar in the *Tabaqāt i-Nasiri*.[135] Al-Idrīsī further observed that "Samandar is a large town, commercial and rich, where there are good profits to be made.... Rice and various grains, especially excellent wheat, are to be obtained here".[136]

Information about import of foreign materials to the region is very scanty. Cowries (kapardakas) surely formed a major item. They were brought mainly from the Maldivi islands, mentioned by Sulaiman as the source of cowries.[137] Archaeological evidence of such import is furnished, as we have noted above, by several finds of cowries, including a hoard in the ruins of Somapura Vihāra (at Paharpur, Rajshahi district), established in the period of Dharmapāla[138] (c. A.D. 775-812). Several later writers (from the 14th century onwards) described in details the trade in cowries between the Maldivi islands and Bangāla (Vaṇgala) or Bengala,[139] in which these were received mainly in exchange of rice.[140]

Another item of import could have been silver. In the early 16th century Tome Pires noted that silver was imported in large quantity into Bengal from Pegu.[141] The import of this metal from South-East Asia might have begun much earlier.[142]

The statement of Al Idrīsī that the island opposite Samandar was frequented by merchants of all countries (see above) suggests active participation of people of different countries [including Arabia, Srī-Laṅkā and some areas of South Asia and China(?)] in the external trade of the region concerned (see section B and n. 42). As noted above, Al Idrīsī observed that "good profits" could be made by conducting trade with Samandar.[143] In the first half of the 14th century, and so not long after our period, Ibn Batūta explicitly stated "nowhere in the world have I seen any land where prices are lower than" in Bangāla.[144] He further noted that the people of Khurāsān used to call it "a hell full of good things".[145] So "good things", good in quality and quantity, and their comparatively cheap price attracted foreign traders to the region concerned.

The sources relevant to our zone and period are silent about the participation of indigenous people in the maritime trade of the area in question. But we cannot discount its feasibility in view of the earlier evidence of voyages made by merchants from Tamralipti to different parts of South-East Asia.[146] We may also note that in the early 15th century Ma-huan wrote that in Pang-ko-la (Vaṇgāla), where "products are abundant", "the rich build ships, in which they carry on trade with foreign nations".[147] There is no evidence to prove that such a condition could not have been existed in some of the preceding centuries.[148]

Commercial activities enriched at least a class of big merchants (see above section C). As noted above, maritime trade yielded profit to foreigners also. The ruling class and administration were interested in trade, including foreign, probably because taxes on articles of commerce (including items on the point of export or import) could have yielded considerable amount of wealth.

Barter might have played an important part in at least comparatively big transactions in internal commerce and also in foreign trade. In such cases gold and silver dust (or piece) of fixed weight could have been used as units of a medium of exchange. This type of money was also in use for ordinary transactions. In Harikela silver coins of high purity were used in transacting business. It is not certain whether such coins as well as foreign coins of high purity were used as bullion to facilitate transactions in maritime trade. The most common medium of exchange in daily economic life was formed by cowries. A unit of gold weighing about 144 grains was of the same worth as that these of 20480 cowries, while 1280 of these were equal in value to a purāṇa or chūrṇī (i.e. silver dust) weighing about 57·6 grains[149] (see above sections D and E).

The above data and inferences go against the theories suggesting that the absence of coins (one of the media of exchange) or drastic reduction in their number indicates decline of trade in the empire of the Pālas and the Senas.[150] There is no evidence of an unusual decline of trade in the territory concerned (including the empires of the Pālas and Senas) in any phase of the period under review (including the age of the Pālas and the haydays of the Senas). On the other hand, the dates of the sources quoted above may suggest brisk trading activities throughout the zone and period. There was also no dearth of media of exchange. No doubt, the ruling authorities did not strike coins, at least not in their names, though they were interested in trade. Perhaps minting of coins was not considered as a royal prerogative. Hence even units of dust of silver or gold could serve as a medium of exchange. In fact, they could serve the trade better than coins of doubtful value. When coins were minted in an area of the territory under review purity of metal had to be maintained, again for their ready acceptability in commercial transactions. The trade was thus highly monetised, though it was not carried on exclusively or even mainly with coins.[151]

Commercial activities enriched the ruling class and at least a section of big merchants. But it is doubtful whether trade helped the raising of standard of economic life of the people. Ibn Batūta referred in the first half of the 14th century to the unusually cheap prices of different commercial items in Bangāla (Vaṅgāla).[152] If such an economic condition was obtainable even in our period the cost of production should have been then comparatively cheap. But the common people or a section of them might not still have the economic power to purchase the daily necessities of life. This is the impression one gets while reading the *Charyāpadas*, at least partly ascribable to our zone and period.[153] Some of these allude to the miserable condition of the people.[154] Ibn Batūta's reference to the sale of "a beautiful slave-girl for a single gold dinar" in a commercially busy area[155] really speaks ill of the economic independence of common people.

However, intensive trade should have encouraged growth of technological knowledge usable for producing important commercial items in quantity (and with improved quality). External trade, carried on by Indians in Indian ships, was partly responsible for disseminating Indian culture outside the country.[156] Traders' importance as purveyors of religion and culture and as pioneers of migration was recognised by Fa-hsien in early 5th century A.D.[157] The evidence of East India's influence in the art and religious life of South-East Asia in the period concerned[158] and that of cultural (and diplomatic) contacts between the Pālas and the Śailendras of Java[159] may indeed allude to the pioneering activities of the Indian traders who braved all hazards of sea-voyage "for the love of gain".[160]

NOTES

[1] R. C. Majumdar, *History of Ancient Bengal*, Calcutta, 1971 (cited below as *HAB*), pp. 94f

[2] B. N. Mukherjee, "Original Territory of Harikela", *Bangladesh Lalitkala*, 1975, vol. I, no. 2, pp. 115-19.

[3] A. M. Chaudhury, *Dynastic History of Bengal*, Dacca, 1967 (cited below as *DHB*), pp. 154f; *HAB*, pp. 199f and 275f. See also our paper on political history in the book entitled *Harikela in Early Mediaeval Times* (*c. 7th-13th Century A.D.*) (to be published shortly from Calcutta).

[4] *HAB*, pp. 199f.

[5] *Ibid.*, p. 133; D. C. Sircar, "Date of the Irda and Kalanda Plates", *New Aspects of History of Orissa*, vol. III, 1981, pp. 1-5.

[6] *HAB*, pp. 212 and 280f; B. N. Mukherjee, "Dharmamāna, A Vassal of the Pāla King Madanapāla", *Journal of the Asiatic Society*, 1973, vol. XV, no. 1-4, pp. 213-16.

[7] R. K. Chaudhuri, "Political History of North Bihar", *The Comprehensive History of Bihar*, vol. I, pt. II (edited by B. P. Sinha), Patna, 1974 (cited below as *CHB*), pp. 291f.

[8] *HAB*, pp. 119f; 137f, 145f and 235f.

[9] *Ibid.*, pp. 142f.

[9a] For information about overland routes in the territory concerned and about those connecting it with other parts of the subcontinent and outside world, see *HAB*, pp. 346-47; H. B. Sarkar, "Bengal and Overland Routes in India and Beyond", *Journal of the Asiatic Society*, 1974, pp. 92f; D. C. Sircar, *The Emperor and the Subordinate Rulers*, Santiniketan, 1982, pp. 81f etc.

[10] Commentary of Aparārka on the *Yājñavalkya-smṛiti*, I, 212.

[11] Sandhyākaranandī *Rāmacharita*, III, 17; *HAB*, p. 338.

[12] N. G. Majumdar, *Inscriptions of Bengal*, vol. III, Rajshahi, 1929 (cited below as *IB*), pp. 86 and 89. The Edilpur grant of Viśvarūpasena mentions "smooth fields growing excellent paddy" (*Ibid.*, pp. 124 and 129).

[12a] For examples, see *IB*, pp. 15,47 and 125.

[12b] Sandhyākaranandī, *Rāmacharita*, III, 17.

[13] *Rājaśekhara, Kāvyamīmāṁsā*, XII; R. C. Majumdar (editor), *The Age of Imperial Kanauj*, Bombay, 1955 (cited below as *AIK*), p. 399.

[13a] *Rāmacharita*, III, 18; III, 33-36.

[13b] The *Charyā-padas*, which are at least partly ascribable to our zone and period (*HAB*, p. 293), refer to spinning of cotton, weaving of coarse cloth and mat (?), basketry and distillery (and so to distillation) (S. Sen, *Chrryāgīti-Padāvalī*, Vardhamāna, 1956, nos. 3, 10, 25 and 26).

[14] *Agni Purāṇa*. CCXLV, 21f.

[15] *Abhidhānaratnamālā*, II, 15f.

[16] *HAB*, pp. 342-43; D. C. Sircar, *Epigraphic Discoveries in East Pakistan*, Calcutta, 1973, p. 67. see also above n. 13b.

[17] It is quite clear from the various accounts of this kingdom that it must denote the powerful Pāla kingdom at a time when it was often engaged in war against the neighbouring kingdoms of Jurz (<Gurz) or Juzr (<Guzr) (i.e. the Gurjara-Pratīhāras) and Ballah-rā (i.e. Ballabharājas or the Rāshṭrakūṭas) (Sulaiman, *Salsilatu-t Twārīkh*, p. 29; Ibn Khurdadba, *Kitābu-l Masālik Wa-l Mamālik*, 67; Al Mas'ūdī, *Murūju-l zahab*, 1, 384; H. M. Elliot and J. Dowson, *The History of India as Told by its own Historians* (cited beow as *HIOH*), vol. I, reprint, Allahabad, pp. 5, 13 and 25). As suggested by S. H. Hodivala, the expression *Ruhmi* (or *Rahma*), denoting this kingdom, is a scribal error for *Dharmi* (or *Dharma*) (S. H. Hodivala, *Studies in Indo-Muslim History, A Critical Commentary on Elliot and Dowson's History of India as Told by its Own Historians*, Bombay, 1939, pp. 4-5). In fact, a variant reading of the name, as given by Ibn Khurdādba, is *Dhmī*. In the *Ḥudūd-al-'Ālam* the name is given as Dahum and has been used as a personal as well as a territorial appellation (sections, 5, 6, 7 and 10; V. Minorsky, *Ḥudūd-al-'Ālam*, "*The Regions of the World*", *A Persian Geography, 372 A.H.—982 A.D.*, London, 1937, pp. 62, 72, 80, 87; see also pp. 236-37). This is quite feasible if the name is considered to stand for the kingdom of Dharmapāla. It is also noteworthy that Al Mas'ūdī took the name concerned as "the title for the kings of the kingdom in question" and "generally at the same time their name" (*HIOH*, vol. I, p. 25). This statement becomes explicable if here is a reference to the kingdom of the Palā monarch Dharmapāla, the members of whose family had the element-*pāla* as a component of their names, and almost as their dynastic title

[like the Imperial Guptas rulers of Magadha, who were referred to as Guptanāthas (i.e. "the Guptalords" or "the lords of the Guptas" in the Mandasor inscription of Yaśodharman]. As the account of Sulaiman, which is the first of Muslim authors to refer to the kingdom in question, is dated in 237 A. H. (or A.D. 851) (*HIOH*, vol. I, p. 2), it could easily allude to the kingdom of Dharmapāla (c. A.D. 775-812). Thus at least the source of his information on the Pāla empire can be dated to the age of Dharmapāla. Basically the same information was furnished by the later Muslim writers.

[18] *HIOH*, vol. I, p. 5 According to Al Mas'ūdī, "they export from this country the hair called *samara*, from which fly-whisks are made, with handles of ivory and silver. These are held over the heads of princes when they give audiance" (*ibid.*, p. 5, f.n. 2). *Chāmara* is produced from the bushy tail of a kind of ox called yak (*chamara*). Both Sulaiman and Al Mas'ūdi refer to an one-horned animal of this country, which can be identified as rhinoceros.

[19] *Ibid.*, vol. I, p. 14. According to another rendering of Ibn Khurdādba's work *Kitab al-Masālik Wa'l-Mamālik* (67), R.hmī (or D.hmī) "possessed"...."cotton, velvet garments and Indian aloes".

[20] Ya'qūbī, *History*, I, 106; V. Minorsky, *op. cit.*, p. 237.

[21] *HIOH*, vol. vol. I, p. 25. The *Rāmacharita* (III, 7) refers to elephants of Mandāra type in Varendrī.

[22] *Ḥudūd al-'Ālam*, 10, 7; V. Minorsky, *op. cit.*, p. 87. According to the *Kāvyamīmāmsā*, Pūrvadeśa grew different species of fragrant plants and trees as well as aloes and grapes (XVII, 93).

[23] For examples see A. K. Maitreya, *Gauḍalekhamālā*, Calcutta, 1319 B.S., pp. 14, 38, 60, 95 and 153.

[24] *Tabaqāt-i-Nasīrī* XX, 5; *HIOH*, vol. II, p. 305.

[25] *Tabāqāt-i-Nasīrī*, XX, 5; *HIOH*, vol. II, p. 308; H. G. Raverty *The Ṭabakāt-i-Nāṣirī*, vol. I, New Delhi, 1970, p. 567.

[26] F. Hirth and W. W. Rockhill, *Chau ju-kua, His Work on the Chinese and Arab Trade in the Twelfth and Thirteenth Centuries, entitled Chu-fan-chi*, St. Peterburg, 1911, p. 97 and p. 35, f.n. 3. In the *Mānasollāsa* appears a list of fabrics for the king's use. It includes the fabrics made in Vaṅga (III, 1017-20).

[27] H. Yule, *Book of Ser Marco Polo*, vol. II. London, 1875, ch. LV, p. 97.

[28] Al Idrīsī, *Nuzhatu-l Mushtak; HIOH*, vol. I, p. 90.

[29] Al Masūdī, *op. cit.*; *HIOH*, vol. I, p. 23.

[30] Sulaiman, *op. cit.*; Ferrand, *Relations des voyages et textes Geographiques Arabes, Persans et Turcs relatif a l'Extreme-Orient du VIII an XVIII Siecles*, pp. 44 and 105. See also above n. 18.

[31] *The Kathāsaritsāgara* of Somadeva speaks of a great market place in the city of Puṇḍravardhana and of rich merchants of Tāmralipti, who *inter alia* used to bring merchandise from interior regions (Penzer's edition of Twany's translation, vol. II, p. 86; vol. III, p. 172; vol. VII, pp. 78 and 99; vol. I, p. 154; etc.). However, we are not sure whether the evidence of this work can be referred to the Pāla age. The *Kathāsaritsāgara* stories may indeed refer to conditions in an earlier age (see below n. 42). But the custom of bringing products of interior regions to port areas could well have continued in the Pāla age.

[32] *Epigraphia Indica* (cited below as *EI*), vol. XXII, pp. 155 and 158; vol. XIX, p. 282.

[33] *IB*, vol. III, pp. 52, 54, 55 and 77; *Rāmacharita*, III, 31-34. R. C. Majumdar (editor), *History of Bengal*, vol. I, Dacca, 1943 (cited below as *HB*) p. 657; *HAB*, p. 340. The *Tabaqāt-i-Nasīrī* alludes to the use of "golden and silver dishes" in the palace of Lakhmaṇīah or Lakshmaṇasena (*HIOH*, vol. II, p. 309). In this connection see also D. C. Sircar, *The Emperor and the Subordinate Rulers*, pp. 44f; and D. C. Sircar, *Aspects of the Cultural History of Ancient Bihar*, Patna, 1983, pp. 42f.

[34] For an example see *IB*, vol. III, p. 54. The *Rāmacharita* refers to wealthy residents of Rāmāvatī (III, 31).

[35] A. K. Maitreya, *op. cit.*, p. 14.

[36] *EI*, vol. IV, p. 254.

[37] *HB*, pp. 278, 282 and 659; *CHB*, vol. I, pt. II, p. 372.

[38] D. Mitra, *Bronzes from Achutrajpur*, Delhi, 1978, pp. 148-149. These images, found at the site of the Nalanda monastery, were probably transferred to there from the relevant market places. Two image inscriptions refer to tala-haṭaka of Nālandā. A Tibetan account locates the Nālandā institution at Dharmagañja (i.e. a market place named after Dharmapāla or associated with *dharma* or religion).

[39] *Ḥudūd-al-'Ālam*, 10, 7.

[40] *Ibid.* Other ports mentioned in the same section of this treatise might have been, if at all, only temporarily under Dahum (Dharmapāla).

[41] A. Karim, "Samandar of the Arab Geographers", *Journal of the Asiatic Society of Pakistan*, 1967, vol. VII, pt. II, pp. 17ff; *Bangladesh Lalitkalā*, 1975, vol. I, no. 2, pp. 115-19. See also below n. 42.

[42] The evidence of the travel of I-tsing through maritime routes from China to Tamralipti and back in the second half of the 7th century A.D. seems to be the last definitely datable record of the use of Tāmralipti as an international port before the rise of the Pālas (J. Takakusu, *A Record of the Buddhist Religion as practised in India and Malay Archipelago*, Delhi, 1966, pp. XXXI, XXXIV and 211). Similarly, the last reliable information about Tāmralipti's fame as an emporium is provided by the Dudhpani inscription of c. 8th century A.D., which refers to the visit of three merchant brothers of Ayodhyā to Tāmralipti and their earning of great amount of wealth at that place (*EI*, vol. II, pp. 344-45). No doubt, the port of Tāmralipti and its rich merchants are referred to in several stories of the *Kathāsaritsāgara* of Somadeva of the 11th century A.D. One of its stories speaks of a sea-journey to Kaṭāha (Kedah in Malay peninsula) undertaken by a merchant of Tāmralipti (Penzer's edition of Twaney's translation, vol. I, p. 155). But since the *Kathāsaritsāgara* is based on a much earlier work called *Brihat-kathā*, the former's evidence cannot be strictly relevant to the period of the Pālas. It appears that Tāmralipti declined as an important emporium in about the 8th century A.D. and so, at the latest by the very early stage of the Pāla rule.

On the other hand, before this period and by the first half of the 7th century A.D. a part of the coastal area of the eastern side of Bangladesh, then included in Samataṭa, had established commercial relations with the outside world. During his stay in Samataṭa in c. A.D. 638-639, Hsüan-tsang got information about Shih-li-Ch'a-ta-lo (Śrikshetra or the district of Prome in Burma), Ka-mo-lang-ka (Pegu and the delta of the Irawadi), To-lo-po-ti (Dvāravatī in Siam or Thailand), I-shang-na-pu-lo (Īśānapura or Kambuja or Cambodia), Mo-ho-chan-p'a (Mahāchampā) or Lin-yi (Champā, now a part of Vietnam) and Yen-mo-no-chou (Yavanadvīpa) or Yen-mo-no country or "island kingdom" of Yen-mo-no (Yavana) (*Hsi-yü-chi*, chuan X; *The Life*, chuan IV ;*She-kia-fang-che*, chuan III). Information about these regions was collected by Hsüan-tsang obviously from the people of Samataṭa having commercial and cultural relations with them. In the latter half of the 7th century A.D. Seng-chi travelled from China by the "southern sea route" and arrived in Samataṭa (S. Beal, *The Life of Hiuen-Tsiang by Shaman Hwui-li*, reprint, Delhi, 1973, p. XL).

Similarly, a port in Harikela (including *inter alia* the Chittagong district) became in the pre-Pāla age the terminating point of a maritime route. In about the latter half of the 7th century A.D. Wu Hing went to O-li-ki-lo (Harikela) from Simhapura (Śrī-Laṇkā). Wu-kwong travelled from China by "the southern sea-route" and arrived at A-li-ki-lo (Harikela) (J. Takakusu, *op. cit.*, p. XLVI; S. Beal, *The Life of Hiuen-Tsiang by Shaman Hwui-li*, pp. XXXIX, XL and XLI). The "southern sea-route" to Harikela probably began at Canton and touched *inter alia* Bhoga (Palembang in Sumatra) and Mo-lo-yu (Malay peninsula, where was Kaṭāha or Kedah). The same route could have (from an earlier time) also reached Tāmralipti in the north-west and Negapatam (Nāgapattana) and Śrī-Laṅkā in the west and south-west (S. Beal, *op. cit.*, pp. XXV-XXVI). It appears from the account of Chia Tan that in about 800 A.D. ships from Kwang-chou (Canton) used to visit *inter alia* Chiu-chou Shih (Taya islands, north-east point of Hainan), Ku-ta Kuo (Nha-Trang on the south-east coast of Vietnam), Pen-t'o-land Chou (Pandurang, now Phan-rang to the south of the last noted place), Chun-t'u-nung Shan (Kondor island near South Vietnam), Straits (Straits of Malacca, perhaps including Straits of Singapore), Ko-ko-seng-ti Kuo (Brouwers island or an island at the mouth of the Siak river in Sumatra), Shen-teng Chou (on the east coast of Sumatra), P'o-lu Kuo (in north-west Sumatra), Ch'ieh-lan Chou (one of the Nicobore islands), Ceylon, Malabar and the Persian Gulf (*T'ang-shu*, 43b, pp. 18b-19b; Wang Gungwu, "The Nan Hai Trade", *Journal of the Malayan Branch of the Royal Asiatic Society*, vol. XXXI, pt. 2, pp. 104-05). From the Nicobor islands a ship could sail to the Chittagong area. In the first decade of the 15th century Ma-huan travelled by a ship from Tsui-lan (Nicobor islands) to Cheh-ti-gan (Chittagong). Favoured "with a fair wind" the ship took twenty-one days to reach the destination (G. Phillips, "Ma-huan's account of the Kingdom of Bengala (Bengal)", *Journal of the Royal Asiatic Society of Ireland and Great Briiatn*, 1895, p. 529).

In this connection we can refer to the great port of Samandar. Though the Arab geographers do not explicitly and clearly state its territorial location, there are indications about its geographical position. According to Al Idrīsī, aloes-wood from Kāmrūt (Kāmarūpa) was used to be brought down to Samandar by a river (*HIOH*, vol. I, p. 90), which must be identified with the Brahmaputra, referred to in the *Tabaqāt-i-Nasirī* as Samundar (*Ibid.*, vol. II, p. 307). On the other hand, Al-Idrisī also placed Samandar on a river coming from the country of Kashmir (*ibid.*, vol. I, p. 90), i.e. from the Himalayas. This probably indicates the Ganges. Chittagong is situated on the sea (*samudra*) and near the mouths of *inter alia* the Ganges (Padmā) and Brahmaputra (Samundar) (+Meghna). According to the opinion of Abul Fazl, the Ganges meets the sea near the port of Chittagong (A. Karim, *op. cit.*, p. 17). In the 14th century Ibn Batūta stated that close by Sudkāwān of Bangāla the river Ganges and the river Jun [Jenai or Jamunā or rather the combined streams of Jamunā (Yamunā), Brahmaputra and Meghna or the combined streams of the Jamunā (Yamunā) and the Brahmaputra) (A. Bhattacharyya, *Historical Geography of Ancient and Early Mediaeval Bengal*, Calcutta, 1977, pp. 31-34)] united and discharged into the sea (II, 9; H.A.R. Gibb, *Ibn Batūta, Travels in Asia and Africa*, 1325-1354, reprint, London, 1939, p. 267). This location suits Cheh-ti-gan or Chittagong, which was indicated by Ma-huan in the early 15th century as the sea-port of Pang-ko-la (Vaṅgāla in a greater sense).

No doubt, some scholars are inclined to identify Sudkāwān with Sātgāon, near Magra in the Hooghly district of West Bengal [J. N. Sarkar (editor), *The History of Bengal*, vol. II, Dacca, 1948, p. 100, f.n. 2; P. N. Ghosh (editor), *Ibn Batutah's Account of Bengal, Translated into English by Harinath De*, Calcutta, 1978, p. 3 of Appendix I]. But Sātgāon (Saptagrāma) was, unlike Sudkāwān, never on the sea-coast. On the other hand, the area of Chittagong is on the sea, and the town of Chittagong is very near the Bay of Bengal and connected with it by a waterway. As noted above, Chittagong, can be considered, like Sudkāwān, as situated not from the Ganges and the Jun (Yamunā) (see also H. Yule, *Cathay and the Way Tither: being a Collection of Mediaeval Notices of China*, vol. II, p 459, n. 1; and N. K. Bhattasali, *Coins and Chronology of the Early Independent Sultans of Bengal*, Cambridge, 1922, pp. 143-44). Moreover, Fakhruddin, referred to by Ibn Batūta as in possession of Sudkāwān, was the master of Division of Sonārgānw (Sonargaon near Dacca) (J. N. Sarkar, *op. cit.*, p. 98) and so of the south-eastern section of Bangladesh, where is Chittagong and not Satgaon. It should also be noted that Ibn Batūta distinguished Bangāla from the land of Laknawtī (II, 9; H. A. R. Gibb, *op. cit.*, p. 267). Bangāla, distinguished from the Land of Laknawtī or Lakshmaṇāvatī or Gauḍa, can never mean Bengal as understood in the Mughal or British period. It should denote Vaṅgāla, which essentially meant a part of lower Vaṅga including the Barisal and Khulna districts; but sometimes its geo-political limits could have extended to greater parts of South-Eastern Bangladesh, including Chittagong. In fact, Taranātha (ch. 27) included Chāṭighābo (=Chāṭigrāma or Chittagong) in Bhaṁgala (=Vaṅgāla) under the Chandras.

Thus the locality of Chittagong was known as Sudkāwān to Ibn Batūta and as Samandar to earlier Muslim writers. It appears from Ibn Khurdādba's account, that ships from West Asia could go *inter alia* to Sind, Mali (Malabar), Sarandip (Śrī-Laṅkā) and Samandar, and that Samandar was connected by a maritime route with Urasīr (a port on the coast of Orissa) (*HIOH*, vol. I, p. 16). As a port of Harikela region, Samandar=Chittagong was connected by maritime routes with South-East Asia and China (see above). If we accept the evidence of the *Ḥudūd-al-'-Ālam* that the royal authority over S (a) m (a) nd-(a) r belonged to Dahum (=Dharmapāla, c. 775 to A.D. 812), then the port came into prominence by the last quarter of the 8th century A.D. Al Idrīsi suggested the international importance of this locality by stating that "one day's sail from this city there is a large island well populated and frequented by merchants of all countries" (*HIOH*, vol. I, p. 90). The island is identifiable with that called Sandwip, situated not far from Chittagong.

[43] B. N. Mukherjee, "Preface", in A. K. Majumdar, *Concise History of India*, vol. III, New Delhi, 1983, p. XVII.

[44] According to the *Ḥudūd al-'Ālam*, the royal authority over *inter alia* S(a)m(a)nd(a)r (=Chittagong) belonged to Dahum (=Dharmapāla) (V. Minorsky, *op. cit.*, p. 87).

[45] *DHB*, pp. 154f. The testimonies of the Mandhuk inscription of Gopāla II and the Baghaura and Narayanpur records of Mahipāla I, all found in the Comilla district, indicate attempts to revive Pāla rule in Samataṭa (which by then was a part of Harikela) in different periods of the 10th century A.D. Even the Chandra rulers of Harikela might have sometimes acknowledged nominal suzerainty of the Pālas.

[46] Tome Pires, *Suma Oriental*, book III; A Cortesao, *The Suma Oriental of Tome Pires, An Account of the East, From the Red Sea to Japan, Written in Malacca and India*, 1512-1515, *and the Book of Francisco Rodrigues*, vol. I, London, 1944, p. 89. In A.D. 1513 Dhanyamāṇikya of Tripurā occupied Chittagong. During a prolonged struggle Chittagong was occupied in turn by different opposing forces till in c. 1517 it was conquered by Nusrat Shah, son of Husain Shah, during the reign of the latter. By 1518 Arakan became a feudatory of Husain Shah (R. C. Majumdar, *History of Mediaeval Bengal*, reprint, Calcutta, 1974, pp. 51-52). All these political activities bring into relief the economic importance of Chittagong. The interest of rich merchants of Western Asia in their trade with Chittagong was so great that one of them (a resident of Baghdad), who frequently visited the port, was said in the *Tārīkh-i-Hamīdī* to have instigated Nāsir-ud-dīn Nusrat Shah to conquer (or rather reconquer) it (*Journal of the Asiatic Society of Bengal*, 1872, vol. XLI, pt I, pp. 336-337). When Portugese came to "Bengala", the city of Bengala (Chittagong) was the chief port (porto grande) and "the main gateway to the royal capital (called) Gaur". (J. J. A. Campos, *History of the Portuguese in Bengal*, reprint, Patna, 1979, p. 21).

[47] *HIOH*, vol. I, p. 90. During a certain period of the 11th century the kingdom of Anoratha (i.e. Aniruddha) of Pagan (A.D. 1044-1077) was extended up to Paṭṭikerā (Comilla district). Hence parts of Arakan and Chittagong must have been included within that kingdom (*HAB*, p. 279). Contact of Kyanzittha (A.D. 1084-1112), the son of Aniruddha, with a Choḷa king (Kulottuṅga I, A.D. 1070-1120) (R. C. Majumdar, *Hindu Colonies in the Far East*, Calcutta, 1944 p. 212), might have been effected through this port or a port of Arakan. We do not know whether the use of the port in question was indicated when Chau ju-kua referred to a (land-cum-sea) route from China to Chu-lien (Choḷa) territory through the kingdom of P'u-kan (Pagan) (I, 19; F. Hirth and W. W. Rockhill, *op. cit.*, p. 94).

[48] *HIOH*, vol. I, p. 90. Not only the Pāla empire and Harikela (when it was outside the Pāla empire), but also some other parts of north India, Kāmarūpa and even some parts of Burma (including Arakan, with which Harikela might have contacts from an earlier age) were within the hinterland of the port of Samandar (=Chittagong). In a later age (early 16th century A.D) Tome Pires referred to the trade of Bengala (carried on apparently through the city of Bengala=Chittagong) with Arakan and Pegu (BK III; A. Cortesao, *op. cit.*, pp. 95-96 and 100).

[48a] See above nn. 42 and 48.

[49] D. Dhar (translator), *Vallālacharitera Vaṅgānuvāda*, Calcutta, 1904, p. 17.

[50] See above n. 46.

[50a] Medhātithi in his commentary on the *Manu-smṛiti*, VIII, 399, refers to royal monopoly of trade in elephants in Pūrvadeśa, or Eastern Country (*AIK*, p. 403). One of the variant readings of the name of the place, where a large number of horses were sold everyday and from where horses were taken to the territory of Lakhaṇawṭī, is given in some manuscripts of the *Tabaqāt-i-Nasīrī* as Kar-pattan (XX, 5; H. G. Raverty, *op. cit*, vol. I, p. 567). If this reading is correct, the locality may have been a town (pattana) founded by the authorities concerned to collect taxes on articles of commerce. It had an emporium controlled by its rulers.

[51] *HIOH*, vol. I, p. 5.

[52] *Rāmacharita*, IV, 36.

[53] *Tabaqāt-i-Nasīrī*, section XX, 5; *HIOH*, vol. II, p. 304; H. G. Raverty, *op. cit.*, vol. I, p. 556. Raverty noticed that in two manuscripts the term *jītal* occurs in place of the word meaning "silver".

[54] *HAB*, pp. 270-277; *DHB*, pp. 263-264.

[55] H. A. R. Gibb, *op. cit.*, pp. 243 and 267.

[56] *JRAS*, 1895, p. 530.

[57] Tome Pires noticed that cowries were imported into Bengala in large quantities from the Maldivi islands (A. Cortesao, *op. cit.*, p. 95).

[58] K. N. Dikshit, *Excavations at Paharpur, Memoirs of the Archaeological Survey of India*, no. 55, Delhi, 1938, pp. 33 and 34; R. S. Sharma, *Indian Feudalism*, 2nd edition, Delhi, 1980, p. 106. A large number of cowries have been unearthed during excavations at a monastic site at Antichak (Bihar).

[59] *IB*, vol. III, p. 47 and 51.

[60] See also *HIOH*, vol. II, p. 306. Kavaḍi (i.e. kapardaka or cowrie) and buḍi (equal in value to 20 cowries) are mentioned in the *Charyāpadas* (S. Sen, *op. cit.*, no. 14).

[61] Fa-hsien, *Fo-kuo chi*, ch. XVI.

[62] *The Journal of the Numismatic Society of India* (cited below as *JNSI*,) 1948, vol. X, p. 28.

[63] A. K. Maitreya, *op. cit.*, pp. 29f.

[64] *EI*, vol. XXXIII, p. 154.

[65] *Ibid.*, vol. XXXV, pp. 237 and 238.

[66] D. C. Sircar is of the opinion that the kapardakas mentioned in this record represent the annual interest paid in the presence of two witnesses [*ibid.*, p. 233; D. C. Sircar, *Numismatic and Epigraphical Studies*, Calcutta, 1977 (cited below as *NES*), p. 53]. But this hypothesis does not explain the reason for recording the payment of only one year's interest. It will be perhaps more logical to think that the kapardakas represented the value of the endowment (expressed in terms of kārshāpaṇa) and were deposited in the presence of witnesses. This fact was entered in the margin of the record.

[67] Varāhamihira, *Bṛihat-saṁhitā* (edited by S. Dvivedi), p. 987.

[68] See also *NES*, p. 51; D. C. Sircar, *Studies in Indian Coins*, Delhi, etc., 1963 (cited below *SIC*), pp. 280-281.

[69] *IB*, vol. III, pp. 63, 87, 102 and 181.

[70] S. K. Chakravarti, "Kapardaka Purāṇa", *Indian Historical Quarterly*, vol. VIII, 1932, pp. 595-599. She also *NES*, pp. 50-52; and B. D. Chattopadhyay, "Currency in Early Bengal", *Journal of Indian History*, 1977, vol. LV, pt. III, p. 52.

[71] *IB*, vol. III, pp. 125, 137, 147, etc.

[72] D. C. Sircar seems to accept them as coins (*NES*, p. 51).

[73] B. N. Mukherjee, "Media of Exchange in Trade of Mid-Eastern India", *JNSI*, 1983, vol. XLV, pp. 161 and 164.

[74] It appears from the *Līlāvatī* of Bhāaskarāchārya of Mahārāshṭra, who is known to have been born in A.D. 1140, that I dramma was equal in value to 1280 kapardakas (*Līlāvatī*, I, 2; *SIC*, p. 281). The same was the value of purāṇa, (see above n. 67).

[75] L. Gopal, *Early Mediaeval Coin-Types of Northern India*, Varanasi, 1966 (cited below as *EMCTNI*), pp. 14-16.

[76] K. N. Dikshit, *op. cit.*, p. 86; A Cunningham, *Archaeological Survey Report*, vol. XI, pp. 174-81; *CHB*, vol. I, pt. II, pp. 620-21

[77] *EMCTNI*, pp. 15-16; *Ancient India*, vol. I, pp. 39-40; *JNSI*, vol. XXXIII, 1971, p. 87, nn. 2 and 4.

[78] *EMCTNI*, p. 15; *JNSI*, vol. XXXIII, 1971, p. 87 and nn. 2 and 4.

[79] *EI*, vol. I, pp. 167f.

[80] R. C. Kar, "Vigrahapāla Coin—Not a Magadha Type", *Journal of the U.P. Historical Society*, ns. vol. II, pt. 2, pp. 72-77; *JNSI*, 1956, vol. XVIII, p. 104.

[81] Hence we cannot accept the theory of Smith attributing them "to one or other of the kings of Magadha named Vigrahapāla" and referring the most "corrupt copies" to Vigrahapāla III of the Pāla dynasty (V. A. Smith, *Catalogue of the Coins in the Indian Museum, Calcutta*, Oxford, 1966, p. 233). Nor can we support the hypothesis that it appears "from the extreme scarcity and the generally debased character of these coins" that the attempt of the Pāla rulers to introduce a currency of their own was a "faint-hearted one and was soon abandoned" (*HB* pp. 667-668). See also K. N. Dikshit, *op. cit.*, p. 86.

[82] S. Prakash and R. Singh, *Coinage In Ancient ndia*, New Delhi, 1968, pp. 501-503, Tables 22.7 and 22.8. See also M. Mitchiner, *Oriental Coins and Their Values: Non Islamic States and Western Colonies*, Sanderstead, 1979, nos. 384-397; and J. S. Deyell, *Living Without Silver, The Monetary History of Early Mediaeval North India* (unpublished thesis awarded the degree of Ph.D. by the University of Wisconsin in 1982), Ch. I.

[83] *Manu-smṛiti*, VIII, 135-136.

[84] *CHB*, vol. I, pt. II, p. 621; *Journal of the Asiatic Society of Bengal*, 1971, vol. XIII, pp. 166-167. Outside coins found in the territory concerned include coins of Gāṅgeyadeva of Tripurī, Govindachandra of the Gāhaḍavāla family and the first Pāṇḍya empire and Gaṅga *fanams*.

[85] According to an inscription of A.D. 1170-71 from Dhod (Rajasthan), 16 Ajayadeva drammas were tested before accepting them as the price for a house (*Annual Report of the Rajputana Museum*, Ajmer, 1922-23, p. 2). The *Lekhapaddhati* refers to drammas bearing the name of king Viśvamalla (Biśāladeva) being examined thrice prior to involving them in transactions [*Lekhapaddhati*, edited by C. D. Dalal and G. K. Shrigondekar, Baroda, 1925, pp. 34 and 43; see also L. Gopal, *The Economic Life of Northern India, A.D. 700-1200*,, Delhi, etc., 1965, (cited below as *ELNI*), p. 224]. These examples suggest that in the territory under review the people, particularly merchants and bankers, would accept coins, especially outside coins for transactions only after examining their intrinsic worth and fixing their ratio of exchange with kapardakas, the basic medium of exchange.

[86] Tome Pires observed in the early 16th century that "these selected cowries come (to Bengala) from the Maldivi inslands in large quantities" (Tome Pires, bk. III; A. Cortesao, *op. cit.*, vol. I, p. 95). The *Uktivyakti-prakaraṇa* of Dāmodara Paṇḍita, who was associated with the coart of the Gāhaḍavālas, speaks of a merchant storing kapardakas in his house (*vaṇijo grihe kaparddakān nikshipyati*) (*Uktivyakti-prakaraṇa*, edited by Jina Vijaya Muni, Bombay, 1953, p. 51, 1. 8; see aslo p. 41, 1. 17). Pyrard de Laval, who visited India in the first decade of the 17th century, remarked that "in one year I have seen thirty or forty whole ships loaded with them (cowries) without other cargo. All go to Bengal, for there only (*sic*) is there a demand for a large quantity at high prices. The people of Bengal use them as ordinary money, although they have gold and silver and plenty of other metals; and what is more strange, kings and great "lords" have houses built expressly to store their shells, and treat them as part of their treasure. All the merchants from other places in India take large quantities of cowries to Bengal, where they are always in demand. They are put in parcels or baskets of 12,000. In dealings between merchants these parcels are taken as counted... They are produced nowhere but at the Maldivis, on which account they serve as petty cash". The same writer observed in connection with the trading activities of Cochin that "the next greatest trade is carried on with Bengal; and the merchandise carried there most frequently is the little shells of the Maldivis, wherewith every year many vessels are laden. The Maldivi people call them Boly, but the other Indians call them Caury; in these they make marvellous profit all over India" (A. Gray, *The Voyage of Francois Pyrard de Laval*, vol. I, London, 1887, Ch. XVII and XXIX; pp. 237-238 and 438; P. Einzig, *Primitive Money, in its Ethnological, Historical and Economic Aspects*, London, reprint, 1951, p. 282). The conditions indicated in these sources could well have been applicable to the zone and period under review.

[87] The *Lokaprakāśa* refers to bill of exchange (*huṇdikā*) for cash, for rice, for barley and wheat, for wine, for purchase (*kriyākāra*), and for horses (Kshemendra, *Lokaprakāśa*, edited by J. D. Zadoo, Srinagar, 1947, p. 13). See also *ELNI*, pp. 170-171.

[88] *IB*, vol. III, p. 137, 11. 44-45; *NES*, p. 50.

[89] *IB*, vol. III, p. 147, 1. 59; *NES*, p. 50.

[89a] *NES*, p. 50.

[90] *EI*, vol. XXVII, pp. 188-189.

[91] *Ibid.*, vol. XXIX, p. 45.

[92] It has been pointed out by D. C. Sircar that Oriya lexicons take *chūrṇī* and *purāṇa* as synonyms of *kāhana* or *kārshāpaṇa* (*ibid.*, vol. XXIX, p. 44).

[93] *NES*, p. 50. In some areas one chūrṇī was considered as equal in value to 100 cowries (*ibid.*; see also M. Monier-Williams, *A Sanskrit-English Dictionary*, reprint, Oxford, 1951, p. 401).

[94] M. Monier-Williams, *op. cit.*, p. 401.

[95] The use of bullion as money is suggested by the Talcher record of Gayaḍatuṅga, which refers to certain quantities of silver measured in palas, māsas and guñjas (*EI*, vol. XIII, pp. 292 and 295; B. P. Majumdar, *Socio-Economic History of Northern India, 1030-1194 A.D.*, Calcutta, 1960, p. 219).

[96] *HIOH*, vol. I, p. 4. In this connection see also D. C. Sircar, "Aspects of Early Indian Economic Life", *Indian Museum Bulletin*, 1979, vol. XIV, p. 57.

[97] *HIOH*, vol. I, p. 5.

[98] *Ibid.*, p. 14.

[99] *Ibid.*, vol. II, p. 365.

[100] A. Cortesao, *op. cit.*, p. 95.

[101] *Ibid.*, pp. 95-96 and 100.

[102] In this connection see also T. Raychaudhuri and Irfan Habib (editors), *The Cambridge Economic History of India*, vol. I, *c. 1200—c. 1750*, Cambridge, pp. 93f.

[103] S. C. Das, *Indian Pandits in the Land of Snow*, reprint, Calcutta, 1965, p. 60.

[104] *Ibid.*, p. 65.

[105] *Ibid.*, p. 66. The information is derived from a Tibetan book of about A.D. 1250, based on information collected from Nagtsho (*Journal of the Buddhist Text Society*, vol. I, pt. I, p. 7, n; A. Chattopadhyay, *Atīśa and Tibet*, Calcutta, 1967, p. 28; see also G. N. Roerich, *The Blue Annals*, vol. I, Calcutta, 1949, p. 321).

[106] *EI*, vol. XIII, p. 292.

[107] The word *hiraṇya*, which occures in several epigraphs, has been considered by a few scholars as evidence of the existence of gold coinage [B. B. De, "Epigraphic Accounts of the Numismatic History of Bengal", *Early Indian Indigenous Coins* (edited by D. C. Sircar), Calcutta, 1970, pp. 144-145]. But it appears from the relevant contexts that the term as used in these epigraphs does not mean 'gold coins' or 'a piece of gold'. It means a tax paid in cash (U.N. Ghoshal, *Contributions to the Hindu Revenue System*, edited by S. K. Mitra, Calcutta, 1972, p. 403). In fact, one of the lexicographical meaning of *hiraṇya* is "money". So the word *hiraṇya* in the inscriptions allude to a medium of exchange, but not to gold coins.

[108] Kauṭilya, *Arthaśāstra*, II, 19; *Manu-smṛiti*, VIII, 131. It is interesting to note that in the *Dravyaparīkshā*, written in V.S. 1375 (A.D. 1318) by the Master of mint of 'Alāūddīn Khaljī, called Ṭhakkura Pheru, there is a reference to hema-ṭaṅkā (v. 137).

[108a] *Lilāvatī*, I, 2; *SIC*, p. 281.

[109] Ṭhakkura Pherū, the master of the mint of 'Alāuddīn Khaljī, referred to the value of different classes of coins with reference to *ṭaṅka* of Allāuddīn (*Dravyaparīkshā*, 51f). Their intrinsic worth determined their "current" value.

[110] For detailed discussions on the coins of Harikela see our articles in different journals like the *Bangladesh Lalitkalā*, 1975, vol. I, no. 2, pp. 115f; *Journal of the Asiatic Society*, 1976, vol. XVIII, pp. 99-101; *Coin Review*, vol. III-IV, 1976, pp. 2-3; *Journal of Ancient Indian History*, vol. X, pp. 166f; etc.

[111] A. K. M. Shamsul Alam, *Mainamati*, Dacca, 1975, pl. IV, no. a and p. 51; *Bangladesh Lalitkala*, 1975, vol. I, pl. XXIV, no. 8 and p. 58.

[112] A. Karim, "Bangladeśe Musalmāna āgamanera prathama yuga", *Sāhitya Patrikā*, vol. VII, pp. 81-102; A. H. Dani, "Early Muslim Contacts with Bengal", *Proceedings of the Pakistan History Conference*, 1961, pp. 184-189; *DHB*, p. 248-49.

[113] *Numismatic Supplement*, 1934, no. XLV, p. 75; K. N. Dikshit, *op. cit.*, p. 87.

[114] J. Walker, *A Catalogue of the Muhammadan Coins in the British Museum*, vol. I, *Arab-Sasanian Coins*, reprint, London, 1967, pp. CXLVII-CXLVIII.

[115] *EI*, vol. XXVII, p. 188.

[116] In the 2nd century A.D. Ptolemy denoted by the name Argyras Khoras (i.e. Silver Country) an area with mines of silver (VII, 2, 17). The name probably meant a part of Arakan, a silver producing region. During the period under review Arakan had surely contacts with Harikela (which ultimately included the Chittagong, Noakhali, Comilla and Sylhet districts) (R. C. Majumdar, *Hindu Colonies in the Far East*, pp. 202f; *Bangladesh Lalitkalā*, 1975, vol. I, no. 2, pp. 117-119). In the early 16th century Tome Pires referred to the trade between Arakan and Bengal (*Suma Oriental*, bk III). He also noted that silver was imported in large quantity into Bengal from Pegu. The availability of imported silver was perhaps one of the factors responsible for good silver coinage of not only Harikela, but also of Bengal Sultans, Tripurā and Assam. In this connection see also T. Raychaudhuri and Irfan Habib (editors), *op. cit.*, pp. 96f.

[117] *Journal of Ancient Indian History*, vol. X, pp. 168f. The legend *Veraka* (with its variants *Vereke*, *Verake*, etc., with locative inflection) should indicate that it was the name of a locality and not of a person.

[118] It is surprising that Simon Digby still attributes all these coins to the Chandra dynasty and ignores the latest researches in Harikela coinage [J. Raychaudhuri and Irfan Habib (editors), *op. cit.*, p. 93].

[119] An epigraph from Chinchani (Thana) about the middle of the 10th century A.D. records a transaction in terms of money coined by a trader called śreshṭhī Gambhuvaka (*EI*, vol. XXXII, p. 60). So in the period concerned traders could issue coins. See also the *Rājataraṅgiṇī* (VII, 211f) and the *Jami'ul Hikayat* (*HIOH*, vol. II, p. 188).

[120] Silver forms more than 80% of the total content of the Harikela silver coins of both the series. In certain specimens it is as high as 93·8%.

[121] According to Tome Pires, who wrote in early 16th century A.D., the silver coins of Bengala (Bengala) called *tanqat* (*ṭaṅka*), weighed "half a tael" which was "nearby six drams". It was worth twenty calains in Malacca and seven cahons (kārshāpaṇas) in Bengala. Each cahon was worth 16 pon(s) (paṇas) and each pon was worth 80 cowries. So a cahon was equal in value to 1280 cowries and a tancat (tanqat) (ṭaṅka) to 8,960 cowries (Tome Pires, *Suma Oriental*, bk III; A. Cortesao, *op. cit.*, p. 93). Thus different indigenous and foreign media of exchange could found in an area, if the circumstances so demanded, their own rates of exchange.

[122] This was true in the early sixteenth century, as indicated by Tome Pires (see above n. 116). This could have been true also in the age concerned (see aove 116).

[123] *Līlāvatī*, I, 2; *Dhārāpāta* current (at least till in the recent past) in the Bengali speaking area; *SIC*, pp. 280-281.

[124] See above n. 123.

[125] *EI*, vol. XXI, p. 85; D. C. Sircar, *Select Inscriptions*, vol. I, 2nd edition, Calcutta, 1965, p. 80. B. M. Barua read *kākanikehi* after *gaṇdakehi* (*Indian Historical Quarterly*, 1934, pp. 57f). If this reading is correct, here we have name of another class coins or of unit of calculation. Kākaṇī is mentioned in the *Arthaśāstra*, II, 12; III, 20 and IV, 10.

[126] *HAB*, pp. 332f.

[126a] A verse (no. 2005), attributed to Śaraṇa in Śrīdharadāsa's anthology *Sadukti-karṇāmṛita* (compiled in Śaka 1127=A.D. 1205-6), refers to the wives of cultivators "having their fingure joints eager in counting the prices of the commodities purchased (by the buyers) at a market" (*haṭṭakrīta-padārtha-mūlya-kalana-uyagra aṅguli-granthayaḥ*). Apparently the wives of the cultivators were supposed by the poet to kave sold their agricultural products at a local market in exchange of countable units of a form of money. Since Śaraṇa as well as Śrīdhara flourished in the kingdom of Lakshmaṇasen, the evidence of the verse is relevant to our zone and period.

[127] Two seals of two different vaṇiks have been unearthed at Rajabadidanga (Murshidabad district) (*Indian Archaeology*, 1968-69, *A Review*, p. 43). The Baghaura inscription of Mahīpāla refers to a vaṇik (*EI*, vol. XVII, p. 353), the Narayanpur inscription of the same king describes a person and also his son as vaṇik (*Indian Culture*, vol. IX, p. 125), and the Mandhuk inscription of Gopāla II mentions a vṛiddha sārtha [vāha] (i.e. old or senior itinerarant trader) (*Indian Historical Quarterly*, 1952, vol. XXVIII. p. 59).

[127a] Different land grants refer to exemptions accorded to donees from *inter alia* "all types of oppression' (*sarvapīḍaṁ*) as well as from all kinds of taxes (A. K. Maitreya, *op. cit.*, pp. 16 and 61; *IB*, vol. III, pp. 74 and 87: D. C. Sircar, *Epigraphic Discoveries in East Pakistan*, p. 68; etc.). Forced labour (*vishṭi*) could have been one of the types of "oppression" inflicted on people by (or with the approval of) the government. So local rulers and big landlords could have resorted to the employment of forced labour at least in agricultural industry. We do not know whether slave labour was an important factor in production in the zone and period. An allusion to the knowledge of slavery is fonnd in verse (no. 513,) attributed to Govardhana (a court-poet of Lakshmaṇasena?) in the *Śadukti-karṇāmṛita* of Śrīdharadāsa of A.D. 1205-6 (edited by S. C. Banerfee, Calcutta, 1965, pp. IX, 139 and 651).

[127b] For some information on production of rice in our region before and during the period concerned, see the *Raghuvaṁśa*, IV, 37; *Rāmacharita*, *Kavipraśasti*, 13; etc.

[128] *HIOH*, vol. I, p. 90.

[129] F. Hirth and W. W. Rockhill, *op. cit.*, p. 35, f.n. 3.

[130] H. A. R. Gibb, *op. cit.*, pp. 17, 43 and 339.

[131] *JRAS*, 1895, p. 523.

[132] The possibility of hydrographic changes in the 7th-8th century cannot be denied in view of the information on changes in the main course of the Ganges in West Bengal in later periods (A. Bhattacharyya, *op. cit.*, pp. 13f.)

[133] For an example, we can point out that aloes-wood from Kāmarūpa, an important item of trade, could be very conveniently broguht along the river Brahmaputra, to the south-eastern coast. Moreover, a port on the south-eastern coast would have been more equi-distant from various areas of Eastern India than one on the south-western coast (of the territory in question).

[134] A port like Samandar was not only approachable from South India, Śri-Laṅkā and South-East Asia, but also was near the territory (of Arakan and Pagan) through which ran a part of the overland portion of the land-cum-sea-route from South India to China (F. Firth and W. W. Rockhill, *op. cit.*, p. 94).

[135] *HIOH*, vol. I, p. 16; vol. II, p. 307.

[136] *Ibid.*, vol. I, p. 90. In the 14th century A.D. Ibn Batūta described Bangāla (Vaṅgāla) as "a vast country, abounding in rice" and "a hell of good things" (H.A.R. Gibb, *op. cit.*, p. 267).

[137] Sulaiman quoted in A. Gray, *op. cit.*, vol. II, p. 429.

[138] K. N. Dikshit, *op. cit.*, 5 and 90.

[139] For examples we can refer to the writings of Ibn Batūta (14th century A.D.) (H.A.R. Gibb, *op. cit.*, pp. 243 and 267), Ma-huan (early 15th clntury A.D.) (*JRAS*, 1895, p. 530), Tome Pires (early 16th century A.D.) (*Suma Oriental*, bk. III) and Pyrard de Laval (early 17th centyry A.D.) (A. Gray, *op. cit.*, vol. I, pp. 237-238 and 438). See also above n. 86.

[140] H.A.R. Gibb, *op. cit.*, pp. 243 and 267; *JRAS*, 1895, p. 530, f.n.

[141] *Suma Oriental*, bk. III.

[142] See above nn. 116 and 122.

[143] See above n. 136.

[144] H.A.R. Gibb, *op. cit.*, p. 267. Ibn Batūta wrote that "I have seen fat fowls sold there at the rate of eight for a single dirham, young pigeons at fifteen to the dirham, and a fat ram sold for two dirhams. I saw two pieces of a fine cotton cloth, of excellent quality, thirty cubits long, sold for two dinars, and a beautiful slave girl for a single gold dinar, that is, two and a hlaf gold dinar in Moroccan money".

[145] *Ibid.*

[146] *HAB*, p. 346; see also above n. 42.

[147] *JRAS*, 1895, p. 530. The *Charyā-padas*, partly ascribable to our zone and period (*HAB*, p. 393), refer to different names and types of boats (S. Sen, *op. cit.*, nos. 8, 10, 13, 14, 15, 38 and 49) and thereby suggest the familiarity of at least a section of the people with water transports.

[148] The "large merchant-vessel", in which Fa-hsien travelled from Tāmralipti to Siṁhala (Śrī-Laṅkā), was apparently built and manned by the Indians. It sailed in the beginning of a winter season and took fourteen days, with favourable wind at its back, to reach Siṁhala (*Fo-Kuo chi*, ch. XXXVII). The large merchant ship by which Fa-hsien went from Siṁhala to Javadvīpa and the one which he took from Javadvīpa for reaching Kwang-chou (Canton) might have been built and/or manned by the Indians. However, the first could have been made by the Simhalese and the latter by the Javanese. At least these were not built or manned by the Chinese. In fact, Fa-hsien had to act as an interpreter when the last noted ship reached Ch'ang-kwang (*ibid.*, ch. XL). I-tsing apparently travelled by an Indian ship from Tāmralipti to Ka-cha (J. Takakusu, *op. cit.*, p. XXXIV). A seal of Mahānāvika Budhagupta from Raktamṛittikā (to be placed near Chiroti in the Murshidabad district), found in Malay peninsula, indicates the contact of sailors of Eastern India with South-East Asia (R. C. Majumdar, *Suvarṇadvīpa*, vol. I, Dacca, 1937, pp. 82-83). So Indian carriers might have been used for the maritime trade in question (see also above n. 147). Arab and Persian sailors and ships must have also participated in it, since much of the information on it comes from early Muslim writers. Among the other participants might have been ships and men from Siṁhala, South-East Asia and China. The ships of the last noted country began to come regularly to the area concerned porbably not before the later part of the period in question. (In this connection see also Wang Gungwu, *op. cit.*, pp. 105f; and F. Hirth and W. W. Rockhill, *op. cit.*, pp. 14 and 18).

[149] The use of the word *chūrṇnika* (i.e. *chūrṇi*) as a unit of money is indicated even in a post-Gupta and pre-Pāla record like the Jayrampur inscription of Gopachandra. It refers to the fixation of annual tax of a land at 100 chūrṇnikas. The amount is referred to as *ārya-piṇḍaka* or "a suitable lump" sum (M. Monier-Williams, *op. cit.*, pp. 152 and 625). The use of "dust" money in this case may indicate paucity of regular pure (silver) coins in the area and period indicated by the record.

[150] R. S. Sharma, *Indian Feudalism*, c. A.D. 300-1200, 2nd edition, Delhi, 1980, pp. 102 and 221; "How Feudal was Indian Feudalism?", *Social Scientist*, February, 1984, vol. XII, no. 2, p. 36; S. M. Devi, "Paucity of Coinage in North-Eastern India after the Fall of the Imperial Guptas", *Coins and Early Indian Economy* (edited by A. M. Shastri), Varanasi, 1976, p. 136; etc. It should also be remembered that even small "more or less self-sufficient economic units" (R. S. Sharma, *op. cit.*, p. 220), with potentialities of producing surplus products of quality, would require outside markets within and/or outside the kingdom or empire including them. As stated above, the territory concerned witnessed internal, transit and also external trade and also knew the use of money. (In this connection see also the *Indian Museum Bulletin*, 1979, vol. XIV, nos. 1-2, pp. 56f). We may add here that a verse (no. 2005) in the *Śadukti-karṇāmṛita*, attributed to a poet probably of the court of Laksmaṇasena, alludes to sale of agricultural products by the wives of some cultivators at a market in return of countable units of exchange (i.e. units of a form of money) (see also above n. 126a).

We cannot also categorically assert that there was a real dearth of coins all over the subcontinent in the early mediaeval period (c. A.D. 750-1200). For an account of the complex system or systems of media of exchange (including coins), see A. S. Altekar and B. N. Mukherjee, "Coinage", *A Comprehensive History of India* (edited by R. C. Majumdar), vol. III, pt. II, New Delhi, 1982, p. 1414.

M. R. Tarafdar believes that there was a "decay of trade and urban centres" in early mediaeval Bengal in the period between the eleventh and thirteenth centuries". (What Tarafdar really means is "the period from the eleventh to the thirteenth century A.D."). According to him, "the situation began to change from the early fourteenth century A.D. when a number of mint towns had come into being and commodity production for exchange had begun". In the opinion of this scholar, the decline in trade is indicated by a period of total absence of coins (M. R. Tarafdar, "Trade and Society in Early Mediaeval Bengal", *The Indian Historical Review*, 1978, vol. IV, no. 2, pp. 274f, especially pp. 275-277, 280, 282 and 285).

We have pointed out above that a region of Bengal (Harikela) witnessed circulation of coins throughout the period in question (including the 11th and 12th centuries A. D.). Moreover, as discussed above, there was in the zone and period a complex system of media of exchange. The operation of this system should indicate the presence or even growth, and not the absence or decline, of trade.

Cowries, imported mainly from the Maldivi islands, formed one of the media of exchange. The use of this item in quantity implies continuation of maritime trade. In the middle of thirteenth century Chau ju-kua referred to production of fine swords, tou-lo (= Bengali *tulo*, meaning "cotton") "cotton stuffs" and common cotton cloth in P'ong-K'ie-lo, i.e. Vaṅgāla (F. Hitrth and W. W. Rockhill, *op. cit.*, p. 97 and p. 102, f. n. 14). Chau ju-kua included cotton (*ki-pei*) in the list of items regularly imported into China (*ibid.*, p. 217). This evidence surely indicates Vaṅgāla's maritime trade. The *Tabaqāt-i-Nasīrī* (XX, 5) referred to a great market for trading in horses at Karambatan, or Karampattan or Kar-pattan [i.e. town (established for collecting) taxes (on articles of commerce)], import of horses into Lakhaṇawaṭī (kingdom of Lakshmaṇasena) and even to the presence of horse-traders āt Nūdīah, one of the cities in the kingdom of Lakhmaṇīah (Lakshmaṇasena) (*HIOH*, vol. II, pp. 305-6 and 8; H. G. Raverty, *op. cit.*, vol. I, pp. 557 and 567).

Trading in horse was so common at Nūdīah, where Lakshmaṇasena was staying when it was invaded by Muḥammad-i-Bakhtyār, that the latter and his companions were imagined by people as merchants dealing in horses. So Nūdīah was an emporium. It may be inferred from the *Tabaqāt-i-Nasirī* (XX, 8) that Lakhn-or or Lakhaṇawaṭī (Lakshmāṇavatī = Gauda) and Deokot or Dīw-koṭ (Bangarh in the West Dinajpur district) were two other important cities in the Sena kingdom (*HIOH*, vol. II, p. 306; H. G. Raverty, *op. cit.*, vol. I, p. 585). Excavations have proved prosperous condition of Bangarh during the Pāla age (K. G. Goswami, *Excavation at Bangarh*, Calcutta, 1948, pp. 5-9 and 38-39). Vikramapura (near Dacca in Eastern Bangladesh) was an important city where one of the victorious camps of the Senas was located (*IB*, vol. III, p. 63, 73, 86, etc.).

Rāmāvatī was an important city in the later Pāla period (*Rāmacharita*, III, 32f). Archaeological excavations and epigraphic data prove the continuation of Devaparvata (in the locality of Mainamati in the Commilla district) as an urban centre in the Pāla-Chandra age (D. C. Sircar, *Epigraphic Discoveries in East Pakistan*, pp. 24 and 65f).

No doubt, archaeological excavations have not laid bare a great number of cities or towns of the period concerned. But here the fault lies with the archaeologists and not with the ruins of the cities. Impressive mounds and available archaeological remains, like those at Mangalkot and Amavati (West Bengal), allude to large city-sites of the period concerned. They still await regular digging by spades of professional archaeologists.

Thus there is no substance in Tarafdar's main inferences. In fact, he himself has admitted in one place that "south-east Bengal had a considerable volume of trade in the peirod extending from the eigthth to the thirteenth century A..D." (*op. cit.*, p. 283). How can he say at the same time that "the period between the eleventh and thirteenth centuries shows a distinct sign of decay in trade" ? (*op. cit.*, p. 282).

Much more confusion marks the paper of V. K. Thakur on "Archaeology of Early Mediaeval Towns in Bengal" (*Purātattva*, 1980-81,no. 12, pp. 140-144). According to him, archaeological excavations at Chandraketurgarh (24 Parganas, West Benagal), Goswamikhanda (Burdwan district, West Bengal) Rajabadidanga (Murshidabad district, West Bengal) and Bangarh (West Dinajpur district, West Bengal) suggest that they survived in the Pāla period for their religious association and that they were "non-commercial townships under the aegis of a political authority". We like to point out that excavations at Bangarh, carried out by the Calcutta University, clearly proved that it was a regular city (not a temple-city) and that one of its prosperous phases corresponded to the Pāla age (K. G. Goswami, *op. cit.*, pp. 5-9 and 38-39). The city was known as Koṭivarsha and later as Devīkoṭa (Deokot of the Muslim writers). The excavation conducted at Goswamikhanda was of a too limited nature to detect the real character of habitation in the whole locality (*Indian Archaeology*, 1963-64—*A Review*, pp. 60-61). Rajabadidanga, on the other hand, was certainly a religious site. The ruins here represent the monastery of Raktamṛittikā, situated near the city of Karṇasuvarṇa (Hüsuan-tsang, *Hsi-yü-chi*, chuan X; S. R. Das, *Rājābādidāngā*, 1962, Calcutta, 1968, pp. 23f, 43 and 56-57). So the locality in question was a monastic site in the neighbourhood of a city. Only a very small portion of the vast area of Chandraketurgarh (as indicated by the remnants of the rampart wall) have been unearthed. Still several objects of decorative and utilitarian value, found here by archaeologists and local people, indicate that it might have been a regular urban centre. There is nothing to prove that religion became the basis of its survival in the Pāla age. At least the presence of a shrine cannot characterise the whole area as the site of a temple city. In fact, the excavators themselvses have admitted that only the relevant "part of the mound was perhaps the centre of religious activity in periods VII and VIII" (i.e. from the third to the sixth and from the seventh to the tenth century A.D.) (*Indian Archaeology*, 1961-62, *A Review*, p. 62). It is dangerous to see in the character of a building the nature of habitation of the whole area. We should also remember that no urban site can be purely non-commercial (even if it grows around a religious institution), since daily necessities of the local people requires commercial transactions. Thus V. K. Thakur is absolutely wrong in taking religion as the base of survival of Bangarh or Chandraketurgarh and in considering Rajabadidanga as the site of a township. It is also surprising that while he wants to determine the character of early mediaeval towns in Bengal, he has confined himself to West Bengal only, and has not taken into account the Bangladesh area of "Bengal". He has completely ignored the famous city site at Maniamati (Comilla district, Bangladesh), which continued to flourish in the Pāla-Chandra period (B. M. Morrison, *Lalmai, A Cultural Center of Early Bengal*, Seattle and London, pp. 120f).

[151] With the advent of Islam the state's attitude to coinage changed. According to the *Tabaqāt-i-Nasirī*, Muḥammad-*i*-Bakhtiyār struck coins after his victory over Lakhmaṇīah (*HIOH*, vol. II, p. 306; H. G. Raverty, *op. cit.*, vol. I, p. 559). We know of gold coins bearing *inter alia* a horseman and the legend *Gauḍa vijaye*. These coins bear the name of Muhammad bin Sam, whom Muḥammad-i-Bakhtiyār is known to have served. These are dated in A. H. 601 (= A.D. 1205). These coins commemorate the conquest of Gauḍa (of the Senas) by a Muslim power. The coins were thus used as a medium of propaganda.

[152] See above n. 144.

[153] *HAB*, p. 393.

[154] *HAB*, p. 393. For eviedence of miserable social and economic condition of ordinary people we may refer to two songs (S. Sen, *op. cit.*, nos. 39 and 49). One of these (no. 49) has used the word Vāṅgālī (literally meaning "a resident of Vaṅgāla") as denoting somebody "very poor and miserable" (*Ibid.*, pp. 28 and 111).

[155] See above n. 144. Ibn Batūta refers to many orchards and innumerable vessels (presumably for carrying people and goods) on the Blue river in Bangāla (Vaṅgāla). But the people had to hand over to the government half of their cultivated crops and also had to pay other taxes (H.A.R. Gibbs, *op. cit.*, p. 271). This partly accounts for the misery of common people in a commercially flourishing area

[156] R. C. Majumdar, *Suvarṇadvīpa*, vol. I, pp. 68f.

[157] *Fo-kuo chi*, ch. XXXVIII.

[158] *HAB*, p. 582; S. K. Mitra (editor), *East Indian Bronzes*, Calcutta, 1979, p. 38f and 46f.

[159] *HAB*, p 582.

[160] In a much earlier age Pliny observed, while speaking of the disvovery by a merchant of a trade-route to Muziris in India, that "India was brought nearer us through the love of gain" (*Naturalis Historia*, VI, 26, 101-104).

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26/4/08

Compiled
1999-2000